

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD

Founded in 1909 by
Stanley Spooner

DEVOTED TO THE INTERESTS.
PRACTICE AND PROGRESS OF
AERIAL LOCOMOTION AND
TRANSPORT

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 1326. Vol. XXVI. 26th Year.

MAY 24, 1934

Weekly, Price 6d.
Post Free, 7½d. Abroad, 8d.

EDITORIAL, ADVERTISING, AND PUBLISHING OFFICES:

Dorset House, Stamford Street, London, S.E.1

Telegrams: "Truditur, Watloo, London,"

Telephone: Hop 3333 (50 lines).

Subscription Rates, Post Free.

UNITED KINGDOM			OTHER COUNTRIES		
	s.	d.		s.	d.
3 Months ..	8	3	3 Months ..	8	9
6 " ..	16	6	6 " ..	17	6
12 " ..	33	0	12 " ..	35	0

CONTENTS

	PAGE
Editorial Comment:	
The Diesel Position	501
Fairey Night Bomber	503
Bristol "Phoenix"	504
Empire Air Day	506
Coupe Deutsch	510
Deschamps Diesel Engine	514
Airisms from the Four Winds	515
Commercial Aviation	517
Foreign Aircraft	521
From the Clubs	523
Book Reviews	525
The Royal Air Force	526
The Industry	528

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- May 24. Empire Air Day.
- May 26. Opening of Doncaster Airport.
- May 27. Deutsch de la Meurthe Cup.
- May 30. Entries close at double fee for King's Cup Race.
- May 31. Conversazione and "Stalling," Wilbur Wright Memorial Lecture, by Prof. B. Melville Jones, before R.Ae.S.
- May 31. Celebration Banquet, Guildhall, Hull, on occasion of First International Air Service (Hull-Amsterdam).
- June 1. Entries close at 12 noon for London-Melbourne Race.
- June 2. Brooklands Air Race Meeting.
- June 2. Brooklands "At Home."
- June 3. London Aeroplane Club Garden Party, Hatfield.
- June 9. Reading Ae.C. Annual "At Home."
- June 16. R.A.F. Reserve Flying Club Annual Flying Display, Hatfield.
- June 23. Lancashire Ae.C. Air Display, Woodford.
- June 23. Henly Rally, Heston Airport.
- June 30. Royal Air Force Display, Hendon.
- July 3-9. 4th International Congress for Applied Mechanics, Cambridge.
- July 7. Opening of Leicester Airport.
- July 8. French International 12-Hours Reliability Trial.
- July 13-14. King's Cup Race. Start and finish at Hatfield.
- July 21. Round the Isle of Wight Air Race.
- July 21-22. French Grand Prix.
- July 28. Bristol and Wessex Ae.C. Garden Party.
- July 29. London-Sherburn Race (York County Aviation Club).
- Aug. 11. London-Newcastle Race (Newcastle-on-Tyne Ae.C.).
- Aug. 15. Air Tour of Italy.
- Aug. 17-Sep. 6. Copenhagen Aero Show.
- Aug. 25. Liverpool and District Ae.C. Garden Party, Speke Aerodrome.

The Diesel Position

WITH its record flight to 28,000 ft., the Bristol "Phoenix" compression-ignition engine has once again focussed attention upon a subject which was coming to be looked upon by many as "shelved." The history of the Diesel aero engine has had at times an appearance of vacillation. It began with a general assumption, soon to be disproved, that the Diesel type of operation, in which ignition is not by an electric spark but by the high temperature reached by compressing air in the combustion chamber, admitting the fuel in the form of a fine spray when the maximum compression has been reached, was fundamentally unsuited to aero-engine design, the pressures reached being such that very high stresses were set up, and a high weight per horse-power being inevitable.

This period of scepticism was followed, when research and development proved the high-speed Diesel capable of a good power output for a given weight, by a period of undue optimism. Weight could be, and was, cut down to figures not very inferior, in the matter of weight per h.p., to those common in petrol-engine practice a few years earlier. Designs appeared in the United States, in Germany, in France and in Great Britain, and engines were built in all these countries. Some achieved a fair measure of success, others appeared to "hang fire." Of general adoption in aircraft there was still no sign. One American engine, the Packard, a radial air-cooled, was produced for a relatively low specific weight. Its outstanding practical achievement was, and is, that it established a world's duration record for continuous flight without refuelling. In Great Britain the first practical manifestation of the Diesel aero engine was the fitting of five water-cooled engines in the airship R. 101. The life of the airship itself was too short to afford any proof one way or the other of the merits of the Diesel type of engine in lighter-than-air aircraft.

In Germany, the Junkers Company designed and produced a water-cooled Diesel aero engine with two banks of opposed cylinders, the combustion chamber in opposing cylinders being common to both, and the pistons moving in and out in opposition to each other. With this type of engine a considerable degree

of success was attained, and after thorough bench tests one of these engines was installed in a Junkers machine and put into experimental operation on the routes of the German Luft Hansa.

At the Royal Air Force Display at Hendon last year, a Bristol "Phoenix" compression-ignition heavy-oil engine was flown in public for the first time. Like the American Packard engine, the "Phoenix" was a 9-cyl. radial air-cooled, similar in appearance to, and developed from, the Bristol "Pegasus" petrol engine. This was generally taken as a sign that the Bristol Company, in conjunction with the Air Ministry for whom the Bristol Aeroplane Co., Ltd., had undertaken the experimental work, intended to continue the development work, but as time went by without more being heard of the engine, many concluded that for some reason the work had been stopped or, at any rate, put in abeyance. The recent altitude record flight proved this assumption wrong, and it became known that for this flight the "Phoenix" engine had been fitted with a supercharger, although one of medium capacity only. D. Napier & Son, Ltd., some time ago acquired the British rights for building the Junkers Diesel engines under licence, and two types, to be known as the "Culverin" and "Cutlass" respectively, are now being built, the former rated at 700-730 b.h.p. at sea level, and the latter at 515-535 b.h.p. at sea level.

ELSEWHERE in this issue of FLIGHT are published articles on Diesel aero engines, one dealing with the Bristol "Phoenix" and the other with an engine designed by a Belgian and built by an American firm. With so much Diesel engine activity going on in various countries, it may well be thought that we are about to enter on a new era in aviation. While we should

be the last to wish to put a damper on Diesel engine development for **SERIOUS** aircraft use, and while we are, as **COMPETITION** a matter of fact, firm believers in the ultimate destiny of this principle of operation for use in aircraft, it is well to realise that recent developments have been such that, in spite of the vast improvements in the design and construction of compression-ignition engines, the type still has a great deal of opposition to meet from the petrol engine with electrical ignition.

A very excellent guide to the situation is provided by Mr. Roy Fedden, the designer of the famous Bristol engines. He, better than, most, realises the advantages of the Diesel engine, yet, in spite of having played a prominent part in its development, Mr. Fedden is fully alive to the opposition which the Diesel still has to face. Here, in part, is what he says (speaking of the Bristol "Phoenix"):

"This engine compares favourably with the best air-cooled petrol engines of four or five years ago, and would be a very interesting proposition technically were it not for the fact that petrol engines have made a big step forward during the last three years, mainly owing to the introduction of new fuels of high octane value, which permit a considerable increase in the compression ratio, thermal efficiency, power output and fuel economy obtainable.

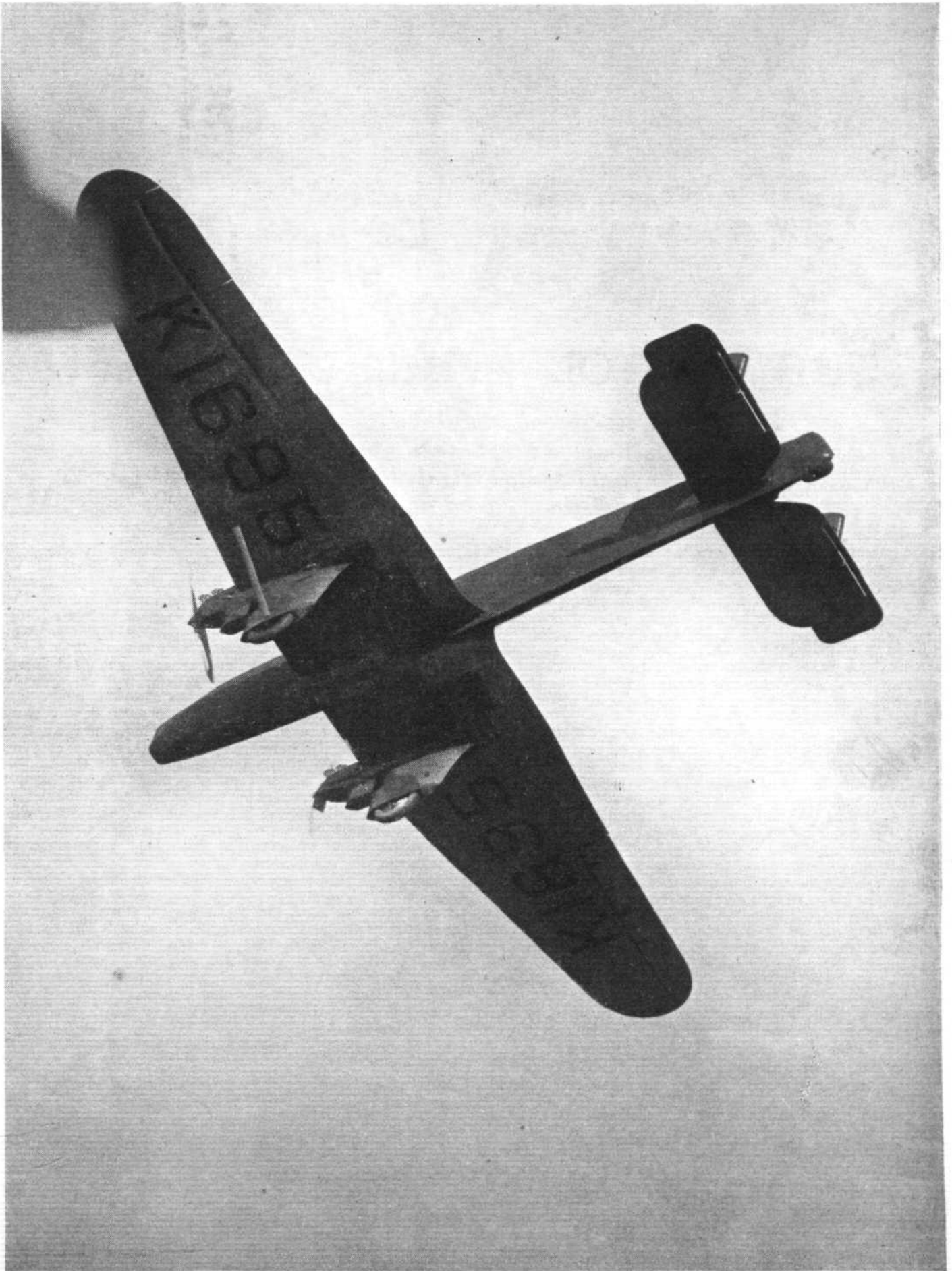
"This advance, together with the further advances anticipated within the next two or three years with fuels of higher octane value, affects very considerably the outlook in regard to the possible use of the compression-ignition engine for military aircraft purposes." Speaking of the figures in the table which is published on p. 504, Mr. Fedden continues: "The comparative data on specific output, consumption and weight of the two types (the Diesel and the petrol engine) demonstrate that, except for greater distances than are wanted for military use and for the special case of long-range and reconnaissance types of flying boat, at the present time the compression-ignition engine cannot pay for itself on a performance basis. In view of this, it is the opinion of the Bristol Company that at present there is no prospect of this type of engine competing with the high-efficiency petrol engine for this particular field of application, except for operation in undeveloped areas in which difficulties would be experienced in obtaining sufficient supplies of the high-quality petrol demanded by modern engines."

AS a reasoned statement of opinion, these remarks of Mr. Fedden's are worth consideration. One may, perhaps, be forgiven for believing that when he speaks of advances made during the last two or three years, and advances to be expected within the next two or three, Mr. Fedden is not unmindful of the promising results which his own firm has had with sleeve-valve

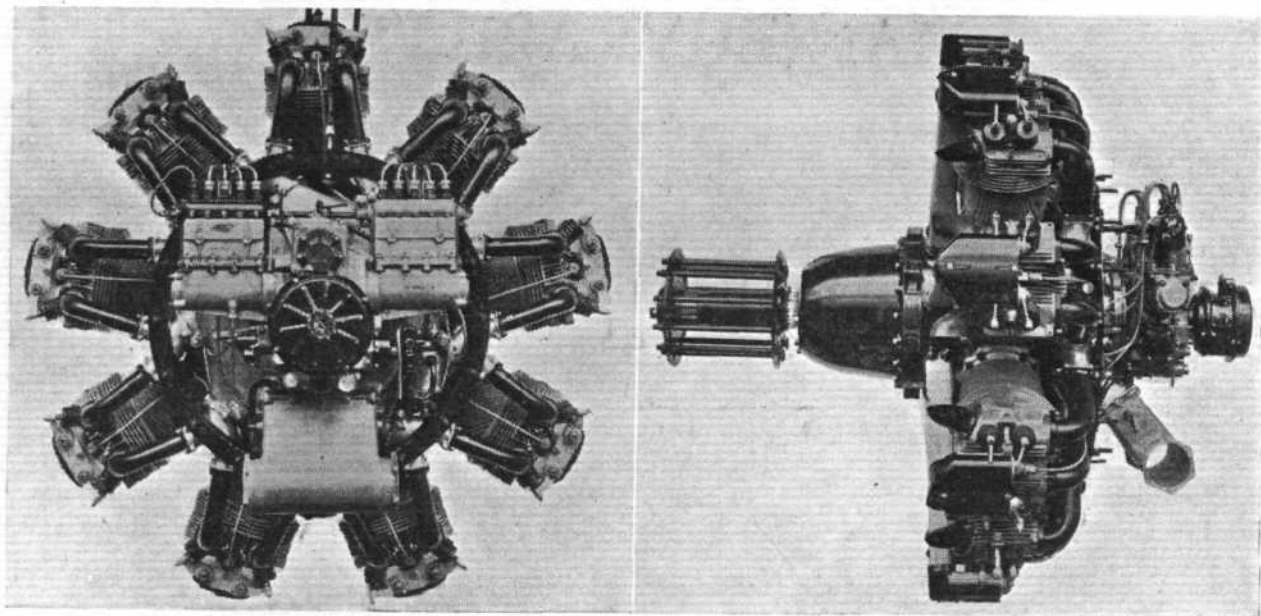
engines. Already in its first form **FOR EMPIRE** the Bristol sleeve-valve engine **ROUTES** showed improvements in consumption as compared with its poppet-valve counterpart, and doubtless this fact will have an important bearing upon developments in the near future.

With the foregoing considerations in mind, one may well ask whether all work on Diesel engines should be dropped. We think that to do so would be a very serious mistake. And we do not believe that Mr. Fedden would advocate such a course. The fact that in the immediate future the Diesel cannot be expected to compete with the petrol engine is not proof that it will not have its very important uses. Mr. Fedden himself gives a clue to one particular sphere in which range is dictated neither by military nor by commercial considerations, but by geographical limitations. The British Empire has more to gain than any other nation from the use of the long-range flying boat. In many districts it is not a question of making flights in short stages in order to maintain a good pay load. It is a case of doing long stages with small pay load, or not to fly at all. The Atlantic route is the most obvious, but there are others in various parts of the British Empire. For their sake alone the Diesel is worth developing. In powers like the Bristol "Phoenix" the compression-ignition engine may be too small for practical application, but we are certain that Mr. Fedden and those associated with him have gained sufficient experience with this engine to be in a position to undertake the production of a much more powerful type. It is in that direction, we think, that progress should be conducted.

MANŒUVRABILITY



THE FAIREY NIGHT BOMBER: In spite of its $8\frac{1}{2}$ -9 tons, Mr. C. Staniland, Fairey's Chief Test Pilot, "throws it about" in an amazing fashion. The engines are Rolls-Royce "Kestrel" III.S, which develop 480 b.h.p. at 11,000 ft. Note the rounded triangle section of the fuselage, which enables the gunner to fire downwards. (FLIGHT Photo.)



THE BRISTOL "PHŒNIX" DIESEL

For a total weight of 1,090 lb. this engine develops 430 b.h.p. at maximum revs., and 470 b.h.p. at take-off at normal revs. Recently the engine established a new world's altitude record in a Westland "Wapiti"

FOR the past eight years the Bristol Aeroplane Co., Ltd., has been working, on behalf of the Air Ministry, on the development of a crude oil compression-ignition engine suitable for aircraft. The work may be said to have born its first fruits recently, when, as announced in *FLIGHT* last week, one of these engines, in a Westland "Wapiti" piloted by Mr. Penrose, attained an altitude of something like 28,000 ft. It is to be hoped that the wonderful results already achieved will encourage those responsible to continue the development in the direction of larger units.

Developed from the now famous Bristol "Pegasus," the Bristol "Phoenix" Diesel engine is a nine-cylinder radial air-cooled, with a bore of 5.75 in. (146.05 mm.) and a stroke of 7.5 in. (190.5 mm.), giving a total swept volume of 1,753 cu. in. (28.7 litres). As in the "Pegasus," there is a reduction gear to the airscrew, the ratio being 0.655 to 1. The engine speed is 2,000 r.p.m. max. and 1,900 r.p.m. normal. The rated power at normal r.p.m. is 415 b.h.p., and the power at maximum speed is 430 b.h.p. For take-off at normal r.p.m. no less than 470 b.h.p. is available. At a weight complete of 1,090 lb. (493.4 kg.), the specific weight, based on normal power, is 2.63 lb./h.p.

For the purpose of obtaining directly comparative data on the "Phoenix" engine, arrangements were made by the Air Ministry for its installation in a standard Service "Jupiter VIII F." engined "Wapiti" general-purpose landplane and for flight tests to be carried out by the Westland Aircraft Company. Little alteration was found necessary to the machine, apart from the fuel system and engine controls.

The report on the very complete series of comparative trials carried out by the test pilot of the Westland Aircraft Company states that:—"In general the Phoenix engine can be said to be perfectly satisfactory from all aspects of operation of an aircraft engine, and in addition possesses advantages which are particularly interesting when considering certain aircraft requirements."

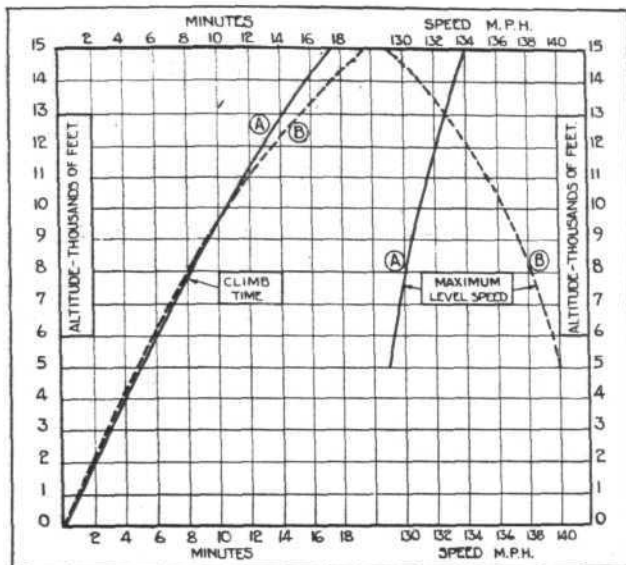
Starting with the hand or electrically energised inertia starter was positive and very satisfactory, no difficulty being experienced, although in one case the engine was standing for a period of approximately seven days between consecutive flights. Regular slow running, though a little faster than with a petrol engine, together with excellent acceleration, were additional features, while the marked smoothness of the engine with no sign of "Diesel thump" was favourably commented on by the pilot, the engine being indistinguishable in this respect from a petrol engine. This smoothness of running was accompanied by exceptional quietness of operation noticeable both from the ground and in the machine.

Analysis of the comparative test results showed that the power output at altitude is maintained a great deal better than is the case with the petrol engine, and this feature is reflected in the performance figures obtained. These show that, compared with the "Jupiter VIII F." engine of slightly higher rated power, the maximum speed at 15,000 ft. is increased by 5 m.p.h. and the climb time to this height improved by 13 per cent. The take-off was equally satisfactory, requiring 13 seconds for a 500-ft. run at the maximum all-up weight of 5,300 lb.

The power maintenance characteristics of the "Phoenix"

Comparative Power, Consumption and Weight Data of 9-cylinder radial air-cooled Diesel and Petrol Engines

Type of Engine	Relative Maximum Output per Litre.		Cruising Fuel Consumption, Lb./B.H.P./Hour	Weight per Cruising B.H.P. Engine Gross to B.S.I. 185 Plus Fuel and Oil				
	Take Off	Flight		2 Hours	4 Hours	6 Hours	8 Hours	10 Hours
Compression ignition, 1934	100	100	0.390	4.16	5.05	5.95	6.84	7.73
Petrol, 1930	126	140	0.543	4.31	5.56	6.80	8.05	9.30
Petrol, 1934	163	174	0.491	3.88	4.99	6.10	7.21	8.32



COMPARATIVE FLIGHT TRIALS: Curve A relates to the "Phoenix" installation in a Westland "Wapiti" (gross weight 4,896 lb.). Curve B represents the standard "Wapiti" with "Jupiter" VIII.F (gross weight 4,810 lb.).

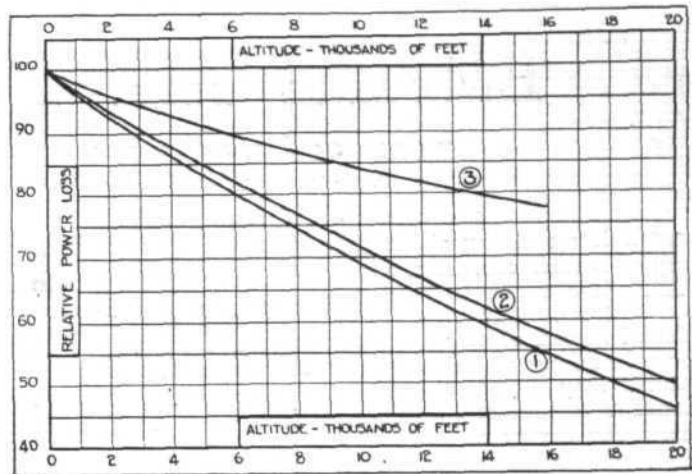
engine in the "Wapiti" aircraft is so remarkable that, in spite of the fact that this machine was a standard two-seater general-purpose type, identical with the many "Wapitis" supplied by the Westland Works to the R.A.F. and foreign governments, it was decided to obtain the maximum ceiling under officially observed conditions.

The effect of altitude on the functioning of the compression-ignition type of engine and the ceiling it was possible to obtain has been a matter of conjecture for some years past. At one time it was considered that this ceiling might be of the order of 15,000 to 18,000 ft., but these figures have actually been exceeded both in Germany and America, and now the "Phoenix" crude oil engine has attained a recorded height of 28,000 ft.

The "Wapiti" general-purpose machine used weighed, complete with pilot, oxygen apparatus and full equipment, 4,564 lb. Although the recorded height attained of 28,000 ft. is subject to official calibration and confirmation, it would appear certain from an examination of the barograph that an altitude of 27,000 ft. has been exceeded, and that the previous record has been beaten by a substantial margin.

Fuel consumption is naturally an outstanding characteristic of the compression-ignition type, and in this respect the "Phoenix" installation showed an improvement of 35 per cent. over the standard "Jupiter VIII F." "Wapiti" installation at the same normal cruising speed.

The foregoing remarks and tests deal with the compression-ignition engine, particularly from the performance or



RELATIVE POWER LOSS AT ALTITUDE: Curve 1, a non-supercharged petrol engine. Curve 2, a supercharged petrol engine. Curve 3 the "Phoenix" Diesel engine. The first two curves are based on Air Ministry correction factors, the last on Westland flight test data.

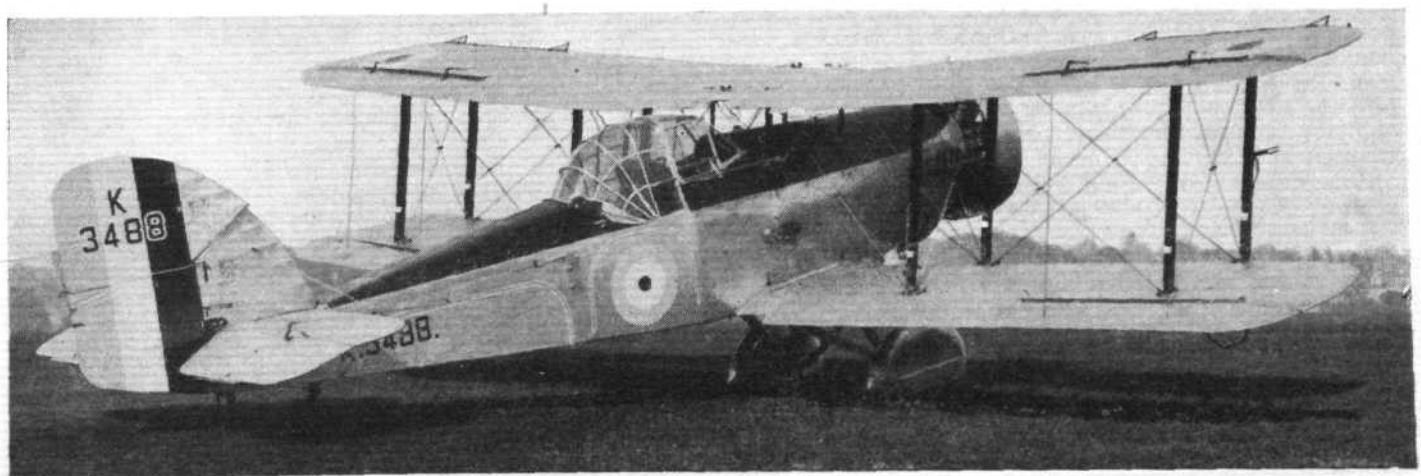
military point of view, but for civil purposes the question of fire risk is of paramount importance as the moral effect of a fire, even though the fatalities were actually due to the preceding crash, is very bad indeed.

The possible causes of fire after a crash are many, and while the actual cause is usually difficult to expose precisely, there is no doubt that the exhaust system is frequently the origin, and this danger is accentuated on many new types of civil aircraft using closely-cowled high-output engines.

In the case of compression-ignition engines, the fire risk is very greatly reduced as, quite apart from the greater safety characteristics of the fuel used and the elimination of the electric ignition system, the operating temperatures of the engine, and particularly of the exhaust system, are much lower than on the corresponding type of petrol engine.

Evidence of this greatly reduced fire risk is available from published data on actual flight experiences with compression-ignition engines in the U.S.A., which show that besides several major crashes with 100 per cent. freedom from fires, cases have occurred on certain types during their development, where minor mechanical breakdowns during experimental flights have resulted in fuel being sprayed continuously on to the exhaust system and engine installation, with no sign of fire despite the continuance of the flight under these conditions to a suitable landing ground. While this reduction in fire risk will quite probably prove the factor deciding the adoption of the compression-ignition engine for civil aircraft, the substantial saving in operating costs shown in the present relative fuel prices is an additional incentive from commercial considerations.

COCKPIT PROTECTION



Transparent wind screens have been used with good results on a Westland "Wallace." Both pilot's and gunner's coupes can be either fully closed or fully open, according to the conditions encountered. The gunner's hood, when closed, still leaves him complete freedom for bombing, wireless, etc.

EMPIRE AIR DAY EXPLAINED

By AIR COMMODORE J. A. CHAMIER, C.B., C.M.G., D.S.O., O.B.E.
(Secretary-General of the Air League of the British Empire)

IS it something about the British character, or is it common to all mankind, that new ideas should spread so slowly? Revolutions may take place which may affect his whole attitude to life, and the ordinary man hardly realises them. In our own time we have seen the development of steam engines, motor road transport, telephones and wireless—the property of a few enthusiasts in the first instance gradually spreading until they became commonplace. But of all the things that have happened, nothing possibly has been of greater moment than the development of travel through the air.

With the first crossing of the Channel by Blériot in 1909, we ceased to be an island, but it is not until twenty odd years later that, as a people, we are just awakening to the fact, thinking solemnly whether it would not be a good thing to put our house in order, and realising that a prosperous nation ill-defended is a standing temptation to the peace of the world.

Civil flying has an equal importance to an Empire which has spread to the utmost limits of our globe. Even in the middle of the Great War, we had some inkling of the truth, since, in 1917, a Cabinet Committee recommended that immediately after the war we should link our Empire together in the air, and this is only just beginning to become an established reality.

At times, impatient at slow progress, we are apt to blame the Government of the day, but although the Government may give a lead, it cannot largely outstrip public opinion. It is the ordinary citizen, the so-called "man in the street," who must become the man in the air before we can ever hope to get a proper realisation of the importance of aviation fully established.

The problem has been attacked from many different directions. The Royal Aeronautical Society, established as long ago as 1866, has existed to stimulate technical development. The Royal Aero Club has under its care the sporting and flying club aspects of aviation, and twenty-five years ago the Air League of the British Empire was founded to help to "vulgarise" aviation to the ordinary man. He could not be a technician, he might not feel that he was young enough to take an active part in the support of flying, but he could, and must, be made interested in aviation and all that it means.

Everyone is restive under taxation, and the fighting services take a large sum out of every man's pocket. Unless he has the opportunity of seeing for what he is paying, he may lend too ready an ear to those who say that he is spending far too much, or that he is not getting value for his money.

Some years ago the Navy recognised this point of view. The fighting forces, and indeed the whole Government of the country, belonged to the man who paid the piper, and it was only right that he should see something of where his money goes. And so they started Navy Week for those who lived near our great seaports, to see the Navy at home, and make friends with it. In some respects, the matter is easy for the Navy, because ships are put into commission only for certain periods, after which periods follow when they are paid off. The officers and men obtain



J. A. Chamier

leave when the ship goes into port for overhaul, and so at any given time may be found ships—not in active commission and manned by nucleus crews—which are available for public inspection.

But in the Royal Air Force, things do not work out like that. The squadrons always remain in being. Individual officers and men on promotion, or for other reasons, may be drafted to other units, individual aeroplanes and engines may be broken up or require overhaul after a long period of service, but their place is immediately taken by more officers, more men, more machines and more engines—and the daily work of the squadron goes on. It must be realised that this work cannot be done in public; some of the work must essentially be of a secret nature, and all of it must be carried out under conditions of strict discipline, so that accidents may be avoided. Members of the public cannot go and spend an interesting day on Royal Air Force aerodromes to see where the money goes; only at the great Air Force Display do they have some opportunity of seeing aeroplanes in considerable numbers, but even then the machines are at

a distance. Our taxpayer can obtain but little idea of the normal conditions of the life which has such a great responsibility towards him.

On the civil side, the position is to some extent the same. When pupils are flying at flying clubs, there is very little time to pay attention to visitors, and they cannot be allowed to swarm all over the aerodromes, poking their heads inside hangars, and generally obstructing the work in hand. Air liners, like railway trains, must keep to time-tables, and flying must be done in orderly fashion.

Aeroplane works are highly organised hives of industry, very often congested, and the public cannot be admitted. If the public could walk through the works at leisure, there would be great interruption, and to the aeroplane constructor, as to every other business, loss of time is loss of money.

Even the touring flying pageants, which do so much to show aviation in every corner of the country, must to some extent keep people at arm's length for fear of accidents.

In fact, on reflection, one is driven to the conclusion that the public can never get inside aviation; it cannot get its numberless questions answered; and aviation, the air, and all that pertains to it, remain a sort of mystery. People cannot be really interested in what they do not understand. They can go to flying meetings—as they flock to circuses and motor race meetings—to get a thrill, possibly with a sneaking hope of an accident. They can admire and applaud stunt flights of every kind—flights which have had a great part in bringing aviation to their notice—but, in order to hold and maintain interest, they must be closer.

From these considerations arose the idea of an air day; a day in which aviation could be "at home" to all the public, when they could be permitted to visit places which they would never otherwise have a chance of seeing, and when those who were inside aviation would welcome their

question, and show them "the works." Which day would be suitable? After long consideration the Air League came to the conclusion that Empire Day was the most fitting. It came at the start of intensive summer flying, so that any interest which it evoked might be sustained throughout the year, and it gave voice to the right principle that the future of our Empire lay in the air.

Could it be brought off? The Royal Empire Society and the Empire Day Movement were approached and gave it every sympathy. Would the Air Ministry play? It was a big thing to suggest that every Air Force aerodrome, with the exception of secret experimental stations, should be thrown open to the public. It meant the sacrifice of a holiday, and it meant causing a great deal of work and trouble to the Air Ministry, to the Area Commanders, and to the personnel of the units themselves. It is pleasant to record that no obstacle was raised, and the proposal met with immediate acceptance by all ranks.

The flying clubs, approached through the National Council of Flying Clubs, were enthusiastically in favour of the scheme.

Imperial Airways, the internal air lines and owners, air taxis, and municipal airports all willingly assisted. The Royal Aeronautical Society gave it their blessing, and bodies interested in aviation, such as the London Chamber of Commerce and the National Chamber of Trade, did all they could through their vast membership to give impetus to the scheme.

The aircraft constructors were in a more difficult posi-

tion. Although anxious and willing to co-operate, physical difficulties in many cases proved too much. Some works were temporarily emptier than their proprietors liked, and naturally they felt that the public would not be interested in shops where there was little going on. Others were too full of work, and it was too difficult to arrange to pass the public through the congested alleyways of the shops. Certain constructors, where these difficulties were not supreme, were able to help, and for the first time the general public will be able to see how Rolls-Royce engines are made, and the works of Saunders-Roe and Sir W. G. Armstrong Whitworth.

What is to become of the proceeds? The Air League is far from being indifferent to monetary support, but it was thought that in this instance, as the Royal Air Force was taking such a large share in the activities of the day, that the profits should go to the Royal Air Force Benevolent Fund, and this has been arranged.

Granted fine weather, it is hoped that the public will celebrate the first Empire Air Day in their thousands. All those connected with aviation should do their best to make the day known, and persuade their friends to visit the aerodromes in which they are interested on that particular day. If it is a success this year, it is hoped that it will be made an annual event, and with the High Commissioners of the Dominions all deeply interested in the idea, in future years it may be possible to make it a *real* Empire Air Day, taking its place among the established institutions of our people.

WHERE TO GO TO-DAY

Details of the Empire Air Day Arrangements for Visitors at R.A.F. Stations, Civil Aerodromes, and Aircraft Works

THE general public will to-day have their first chance of seeing the inner workings of the Royal Air Force, by reason of the efforts of the Air League of the British Empire, who have managed to put the word "Air" between "Empire" and "Day."

Actually, 41 stations will be open between 2 p.m. and 7 p.m.—or even later if circumstances demand it—and arrangements have been made for people to be conducted around at each. Admittance charges will be specially low, these being 1s. for adults and 6d. for children (though organised parties will be admitted at 3d. per head), and the proceeds will be devoted exclusively to R.A.F. charities. Tickets for the Display, incidentally, on June 30 will be on sale at each R.A.F. Station.

People living in the London area will have an opportunity of seeing their air defence in action, and the inner ring of fighter squadrons has been completed by the transference of Nos. 3 and 17 squadrons from Upavon to Kenley. The outer defences, consisting of "Interceptor" fighter squadrons with machines having a high speed and exceptionally fast climb, will be seen at Hawkinge, Kent, and at Tangmere, Sussex. Few of the public realise that at every defence station there is, even in peace time, a flight in absolute readiness to fly to 16,000 ft. after half-an-hour's notice has been given.

Although the share of the R.A.F. in the arrangements is

affording such a unique opportunity, the civil side should not be forgotten. At several aerodromes very special efforts will be made to give the public a really good show without necessarily interrupting the normal routine. Therein lies the feature of this Air Day. The public will see every aerodrome as it really is on a normal hard-working day.

Additionally to those mentioned below, three firms will be open for public inspection on the Saturday following. These are: Sir W. G. Armstrong-Whitworth Aircraft, Ltd., of Whitley, Coventry, manufacturers of civil and military types; Saunders-Roe, Ltd., of Cowes, Isle of Wight, manufacturers of seaplanes, amphibians, and landplanes; and Rolls-Royce, Ltd., of Derby, makers of the engines used in many of our fastest service machines. On Wednesday, too, the wireless station on Mitcham Common will be open to the public.

At the moment of going to press, it is known that a D.H. "Tiger Moth" has been loaned by the de Havilland Company to Mrs. Mollison for special visits, and a D.H.86 for a special "press" tour round England. Messrs. Germ Lubricants, Ltd., have placed their own "Puss Moth" at the disposal of the Secretary-General of the Air League, who will be visiting several aerodromes.

In the guide below, aerodromes have been grouped alphabetically according to their respective counties, with the exception of those within specially easy reach of London.

LONDON AREA

R.A.F. STATIONS

Biggin Hill: Kent: Nos. 32 and 23 Fighter Squadrons equipped with Bristol "Bulldogs" and Hawker "Demon" two-seat fighters, the latter an experiment which has proved successful. Formations, wireless demonstration, and flight attack practice.

Hornchurch: Essex: No. 111 Fighter Squadron equipped with Bristol "Bulldogs." Rapid re-armament and all usual work.

Kenley: Surrey: Nos. 3 and 17 Fighter Squadrons equipped with Bristol "Bulldogs."

CIVIL STATIONS

Croydon: Airport of London: Imperial Airways organisation. (Flights.)

Heston: Middlesex: Airwork, Ltd., with the assistance of the Comper Aircraft Co. (Flights.)

Brooklands: Surrey: Brooklands Flying School and Club, open from dawn till dusk. (Flights by ballot.)

Loughton: Essex: Commercial Airways, Ltd.

Romford: Marylands Aerodrome: Essex: Hillman Airways, Ltd.

Hanworth: Feltham, Middlesex: National Flying Services, Ltd. Special display in conjunction with Aircraft Exchange and Mart, Ltd., who sell the Airspeed "Courier," the British Klemm Aeroplane Co., Ltd., and the Cierva Autogiro Co., Ltd. (Flights.)

“AIR DAY” AERODROMES



At all the aerodromes shown special arrangements will be made for visitors. Details are given in the accompanying article.

GENERAL

BEDFORDSHIRE

Henlow, Aircraft Depot : R.A.F. : General maintenance of Service machines and practice parachute descents ; dummy and live drops. Formation by five "Moths."

Dunstable, Tring Road : London Gliding Club.

BERKSHIRE

Woodley Aerodrome, Reading : Phillips and Powis, Ltd., and Reading Aero Club. (Flights.)

Abingdon : No. 40 Day Bomber Squadron equipped with Fairey "Gordons," and the Oxford University Air Squadron. Formations, oblique photography, exhibition of armament gear, including 250-lb. bombs, and photography.

BUCKINGHAMSHIRE

Halton, near Wendover : R.A.F. : School of Technical Training for Aircraft Apprentices.

CAMBRIDGESHIRE

Fen Ditton, near Cambridge : Marshall's Flying School. (Flights.)

Duxford : R.A.F. : No. 19 Fighter Squadron equipped with Bristol "Bulldogs." Skywriting practice for Display.

CHESTER

Sealand : R.A.F. : No. 5 Flying Training School. Aircraft flown by pupils, and formation flying.

Hooton Park : Liverpool and District Aero Club.

DEVONSHIRE

Roborough, near Plymouth : Plymouth and District Aero Club.

Mount Batten, Plymouth : R.A.F. : No. 204 Flying Boat Squadron equipped with Supermarine "Southamptons," and No. 209 F.B.S. equipped with Blackburn "Perths."

Halton, near Teignmouth : The Agra Engineering Co.

DURHAM

Usworth : R.A.F. : No. 607 County of Durham Bomber Squadron equipped with Westland "Wapitis."

ESSEX

North Weald, near Epping : R.A.F. : Nos. 29 and 56 Fighter Squadrons, equipped with Bristol "Bulldogs." Flight attack on drogue target.

Broxbourne, near Hertford : Herts and Essex Flying Club. (Flights.)

GLAMORGAN

Pengam Moors, near Cardiff : Cardiff Aeroplane Club. (Flights.)

GLOUCESTERSHIRE

Churchdown, near Gloucester : Cotswold Aero Club. The Gloster Company will send over a demonstration machine. (Flights.)

Filton, near Bristol : R.A.F. : No. 501 (City of Bristol) Bomber Squadron (Reserve), equipped with Westland "Wallaces."

HAMPSHIRE

Andover : R.A.F. : No. 12 Day Bomber Squadron, equipped with Hawker "Harts," and No. 101 D.B.S., equipped with Boulton and Paul "Sidestrands" (twin engined). No. 12 Squadron will bomb moving target in Christchurch Bay or, alternatively, stationary target at Porton bombing range. School of Air Photography.

Worthy Down, near Winchester : R.A.F. : Nos. 7 and 58 Night Bomber Squadrons equipped with Vickers "Virginias."

Atlantic Park, near Southampton : Southampton Municipal Airport with the Hampshire Aeroplane Club. (Flights.)

Hamble, near Southampton : Air Service Training, Ltd. Completely equipped civil training school for both landplane and seaplane work. Open from 2 p.m. to 7 p.m.

Hilsea, near Portsmouth : Portsmouth Municipal Airport. Portsmouth, Southsea, and Isle of Wight Aviation, Ltd. Airspeed, Ltd., manufacturers of fast civil types.

Lee-on-Solent : R.A.F. : Area Headquarters and School of Naval Co-operation. Training naval observers ; catapult work ; Hawker "Osprey" and Fairey IIF on exhibition.

Calshot, near Southampton : R.A.F. : No. 201 Flying Boat Squadron and Flying Boat Training Squadron equipped with Supermarine "Southamptons." Demonstrations. No. 201 will be attacked by No. 56 Fighter Squadron at 2,000 ft., a short "Rangoon" will be tested before being flown East, and bombing practice.

Gosport : R.A.F. : Coast Defence Training Units. Co-operation with local anti-aircraft divisions, formations, signals, deck-landing training, target towing, blind flying, and minor aerobatics.

HERTFORDSHIRE

Hatfield Aerodrome : Barnet By-pass : London Aeroplane Club. (Flights.)

ISLE OF WIGHT

Ryde : Portsmouth, Southsea, and Isle of Wight Aviation, Ltd.

KENT

Hawkinge, near Folkestone : R.A.F. : No. 25 Fighter Squadron, equipped with Hawker "Furies," which are high-speed "Interceptor" fighters. Practice firing at butts.

Manston, near Margate : R.A.F. : No. 500 County of Kent Bomber Squadron equipped with Vickers "Virginias," and School of Technical Training.

Bekesbourne, near Canterbury : Kent Flying Club. Short "Scion" demonstration. (Autogiro flights.)

Eastchurch : R.A.F. : Armament Training School. High-altitude and low bombing, camera gun practice, demolition, and gun practice.

LANCASHIRE

Squire's Gate Aerodrome, Blackpool : Blackpool and West Coast Air Services, Ltd. (Flights.)

Hesketh Park Foreshore, Southport.

Barton, near Eccles, Manchester : Airport of Manchester : Airwork, Ltd. Model flying demonstration.

LEICESTERSHIRE

Radcliffe, near Leicester : Leicestershire Aero Club. The aerodrome is a "perfect private airport." (Flights.)

LINCOLNSHIRE

Waltham, near Grimsby : Lincolnshire Aero Club.

Waddington : R.A.F. : No. 53 County of Lincoln Bomber Squadron and Special Reserve Squadron, equipped with Handley-Page "Hinaidis."

Cranwell : R.A.F. : R.A.F. Cadet College and Electrical and Wireless School.

Grantham : R.A.F. : No. 3 Flying Training School.

Mousehold : Norwich : Norfolk and Norwich Aero Club. (Flights.)

NORTHAMPTONSHIRE

Sywell, near Northampton : Northamptonshire Aero Club. (Flights.)

Wittering : R.A.F. : Central Flying School with full training equipment. There may be inverted flying practice for the Display during the evening.

NORTHUMBERLAND

Cramlington, near Newcastle : Newcastle-on-Tyne Aero Club. (Flights.)

NOTTINGHAMSHIRE

Hucknall : R.A.F. : No. 504 County of Nottingham Bomber Squadron (Special Reserve) equipped with Westland "Wallaces."

Tollerton, near Nottingham : Nottingham Airport and Flying Club, Ltd. (Flights.)

OXFORDSHIRE

Upper Heyford : R.A.F. : No. 99 Night Bomber Squadron equipped with Handley-Page "Heyfords," and Nos. 18 and 57 Day Bomber Squadrons equipped with Hawker "Harts."

Witney : Universal Aircraft Services, Ltd.

PEMBROKESHIRE

Pembroke Dock : R.A.F. : No. 210 Flying Boat Squadron equipped with Supermarine "Southamptons." Armament demonstration, including "bombing teacher."

SOMERSET

Whitchurch : Bristol : Municipal Airport. Norman Edgar and Co., Ltd.

STAFFORDSHIRE

Meir Aerodrome, near Stoke : North Staffordshire Aero Club.

SUFFOLK

Ipswich : Eastern Counties Aero Club.

SUSSEX

Tangmere, near Chichester : R.A.F. : Nos. 1 and 43 Fighter Squadrons, equipped with Hawker "Furies," high-speed "interceptor" fighters. During the early evening formation aerobatics will be rehearsed for the Display.

Shoreham : Southern Aero Club. Special Empire Air Day display. (Flights.)

Wilmington, near Eastbourne : Sussex Aero Club. Special display and parachute descent.

WARWICKSHIRE

Castle Bromwich, near Birmingham : R.A.F. : No. 605 County of Warwick Bomber Squadron equipped with Westland "Wapitis." Midland Aero Club.

WILTSHIRE

Boscombe Down : R.A.F. : Nos. 9 and 10 Night Bomber Squadrons equipped with Handley-Page "Hinaidis."

High Post, near Salisbury : Wiltshire School of Flying.

Old Sarum : R.A.F. : No. 16 Army Co-operation Squadron and School of Army Co-operation, equipped with Hawker "Audax." Supply dropping to ground forces and artillery spotting ("puff shooting").

Larkhill : R.A.F. : Balloon Training Centre. Handling of balloons on ground and usual training. Transferring kite balloon across country.

Netheravon : R.A.F. : Fleet Air Arm and Army Co-operation Squadrons equipped with Hawker "Audax." Message picking will be practised for the Display.

YORKSHIRE

Thornaby : R.A.F. : No. 608 N. Riding Bomber Squadron equipped with Westland "Wapitis."

Catterick : R.A.F. : No. 26 Army Co-operation Squadron equipped with Hawker "Audax." Formation flying, supply dropping, message picking, and "dive bombing."

Yeadon, near Leeds : Yorkshire Aeroplane Club.

Sherburn, near Selby : York County Aviation Club, Ltd.

Hedon, near Hull : Hull Aeroplane Club.

Londonderry, near Northallerton : Yorkshire Air Services. (Flights.)

SCOTLAND

Abbotsinch, near Paisley : R.A.F. : No. 602 City of Glasgow Bomber Squadron equipped with Hawker "Harts."

Leuchars, Fife : R.A.F. : Training Base for Fleet Air Arm. Blind flying, dual instruction, demonstrations, catapult work, and formations.

Donibristle, Fife : R.A.F. : Torpedo Bomber Training Unit.

Turnhouse, near Edinburgh : R.A.F. : No. 603 City of Edinburgh Bomber Squadron equipped with Hawker "Harts."

NORTHERN IRELAND

Aldergrove, near Belfast : No. 502 (Ulster) Bomber Squadron equipped with Vickers "Virginias."

COUPE DEUTSCH

In last week's issue of "Flight" was published a list of the entries for the Coupe Deutsch, which is to be competed for over a circuit starting and finishing at Etampes-Mondésir aerodrome, near Paris, on Sunday next. There are eight competitors, of which seven are French and one British, the Comper "Streak." Of the French machines, five are Caudrons and two Potez. Last year's race was won by Detre on a Potez (315 h.p. Potez radial air-cooled engine) at an average speed of 322.8 km/h (200.5 m.p.h.). Four of the Caudrons have been entered by the Caudron Company, the fifth by Regnier

As a Potez machine, type 53, won the race for the Coupe Deutsch last year, considerable interest attaches to the 1934 Potez machines, of which two have been entered. In general appearance and construction, they resemble the 1933 machines, but owing to the new qualifying tests certain modifications have been made, notably to the fuselage, undercarriage, pilot's cabin, and power plant. The two 1934 Potez machines, both low-wing cantilever monoplanes, are a type 53-2, with Potez 9 Bb. engine, and a Potez 53-3, with a similar power plant. The type 53-2 is similar to last year's model, but has been "cleaned up" in an attempt to gain a few miles per hour. It is understood that this machine is regarded as the Potez company's stand-by for the race, and the power taken from the engine is 315 b.h.p. From the engine of the 53-3 no less than 350 b.h.p. are taken, and this machine, specially designed for this year's race, is believed to be a good deal faster. It is to be assumed that if the engine of the 53-3 stands up to the race, this machine will go "all out" to win, and that if it breaks down, the 53-2 will be counted upon to have the necessary reliability to complete the course.

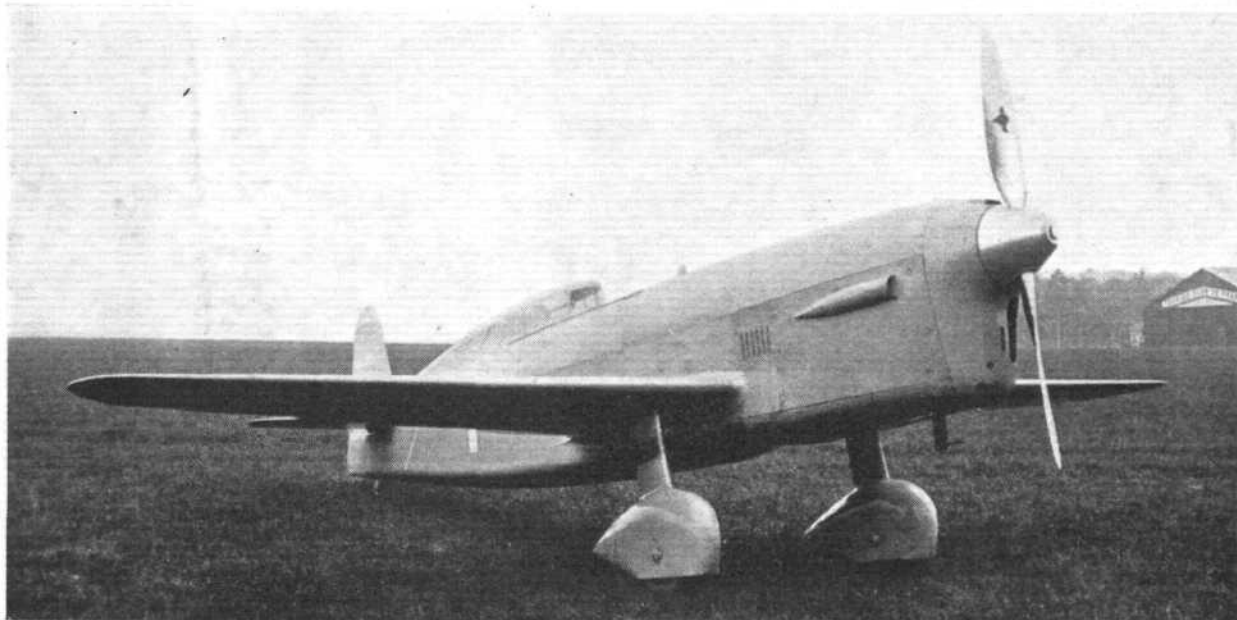
Modifying Last Year's Model

One result of the 1934 qualifying tests has been that the wing area of the Potez 53-2 has been slightly increased, and trailing edge flaps have been fitted between the fuselage and the ailerons, the combined effect of the extra area and the increase in lift from the flaps being to enable the machine to pass easily the take-off and alighting tests. Fuselage modifications consisted in lengthening the elliptical section rear portion, leaving the nose portion unaltered. It is stated that a considerable reduction in drag has been achieved.

Of changes in the retractable undercarriage, the most important is the substitution of wheels with 500 x 150 tyres for the 420 x 180 tyres used last year. This has enabled the wheels to be more completely "buried" in the wing.

The Latest Type

Resembling in its general lines the 1933 model, the Potez 53-3 has a rather better streamline shape, and the wing area is slightly smaller. A reduction in fuselage diameter to 1 ft. 8 in. has reduced the drag, and drop-



"ATALANTE": The Caudron C.366 (Regnier engine) entered by M. Regnier.

ping the pilot's seat a little has improved the fuselage shape if not the pilot's view. With a large N.A.C.A. cowling in the nose of the machine, the view forward cannot be particularly good, but doubtless the constructors and pilots regard it as sufficient for racing purposes.

The power plants of the two Potez machines are similar, being the nine-cylinder radial air-cooled 9 Bb. Both are supercharged, and both give direct drive to variable-pitch airscrews, a fact which assists the take-off very materially. As already mentioned, the engine of the older machine develops 315 b.h.p., while that of the 1934 model develops 350 b.h.p.

Performance figures are rarely available before a race, and the speeds established in the qualifying trials are no guide, since there was no incentive to go "all out," so long as the speed demanded as a minimum was attained. The Potez company claim, for the two Potez types entered, speeds of 400 km./hr. (249 m.p.h.) and 450 km./hr. (280 m.p.h.) respectively. These figures relate to straight-line flying, and it is hardly to be expected that they will be attained in the race over a closed circuit.

Potez Data

Following are the main data relating to the Potez type 53-2 (i.e., the modified 1933 model):—Length o.a., 5.9 m. (19 ft. 4½ in.); wing span, 7.2 m. (23 ft. 7½ in.); wing area, 8 m.² (86.1 sq. ft.). Tare weight, 550 kg. (1,212.5 lb.); weight of fuel, 265 kg. (584.2 lb.); weight of pilot, 75 kg. (165.3 lb.); gross weight, 890 kg. (1,962 lb.).

Corresponding figures for the 1934 model (53-3) are:—Length o.a., 5.72 m. (18 ft. 9 in.); wing span, 7.1 m. (23 ft. 3½ in.); wing area, 7.6 m.² (81.8 sq. ft.). Tare weight, 550 kg. (1,212.5 lb.); weight of fuel, 300 kg. (661.4 lb.); weight of pilot, 75 kg. (165.3 lb.); gross weight, 925 kg. (2,039.3 lb.).

The Potez 9 Bb. engine is a nine-cylinder radial air-cooled, with a bore of 98 mm. (3.86 in.) and a stroke of 113 mm. (4.45 in.). The swept volume is just under the 8 litres (488.2 cu. in.) permitted by the regulations for the Coupe Deutsch. The weight of the engine is 180 kg. (396.8 lb.). While the engine of the 53-2 runs at 2,550 r.p.m., that of the 53-3 has a speed of 2,800 r.p.m., the extra speed increasing the power from 315 b.h.p. to 350 b.h.p. Both engines are supercharged.

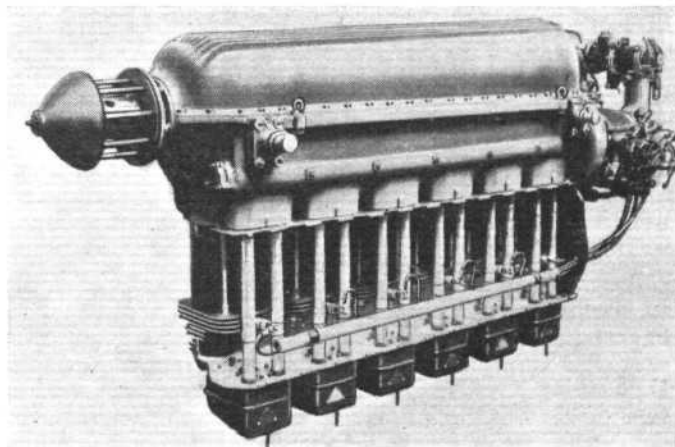
AVIATION SOCIETY

A CURIOUS vagueness surrounds the aims and objects of a new movement in the aviation world. The style of the affair is the "Aviation Society," and at an inaugural function held at 7, Park Lane, last Thursday, one had expected someone to get up and explain the objects for which the Society has been formed (or is being formed, there being no very obvious tangible entity in existence yet), but no one said anything, nor was anyone given an opportunity to oppose the suggested formation of the

The Regnier Entry

Emile Regnier has entered a Caudron type C.366, which is similar to the 1933 Caudron Coupe Deutsch machines. It is fitted with a Regnier six-cylinder inverted air-cooled engine. This engine, it may be remembered, began life as a four-cylinder inverted de Havilland engine, but M. Regnier has begun original design, and has, we understand, produced the six-cylinder version independently of the de Havilland company. The engine has a bore of 114 mm. (4.5 in.) and a stroke of 130 mm. (5.12 in.). The capacity is 7.96 litres (485.7 cu. in.), and the engine is stated to develop a maximum of 217 b.h.p. at 2,450 r.p.m. The weight is 185 kg. (412.3 lb.), including propeller hub. At the moment it is not decided whether the airscrew fitted in the race will be a Ratier or a Levasseur variable-pitch propeller.

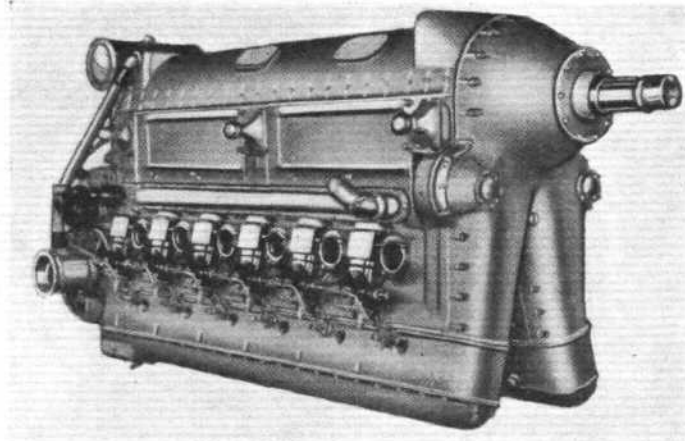
R. C. W.



BRITISH INFLUENCE: The Regnier 6-cylinder inverted engine has a strong resemblance to the de Havilland engines, from which it has been developed. It is of 217 b.h.p.

Society. From some typewritten sheets handed out, the only concrete statement among a lot of vague talk of "airmindedness" was that the membership fee will be five shillings, and that any member who enrolls 25 new members will be taught to fly free. How and where it is proposed to get an "A" licence for £6 5s. one was not informed.

The only name from the executive council known in flying circles is that of Mr. J. A. Mollison.



A 1,200 H.P. DIESEL ENGINE

Designed by a Belgian Engineer, M. D. J. Deschamps, and now, we understand, being built by the Lambert Engine and Machine Company, of Moline, Illinois, U.S.A., the new engine is claimed to be designed for a power output of 1,200 b.h.p. and a total weight of 2,400 lb.

DIESEL engines are to the fore just now. The world's altitude record recently established has called attention to the British "Phoenix" compression-ignition heavy-oil engine, and now comes news from America of a large inverted Vee 12-cylinder design, water cooled, which claims to be the world's most powerful Diesel aero unit. The design owes its origin to M. D. J. Deschamps, a Belgian engineer who was formerly associated with the Minerva Company, for whom he designed a sleeve-valve type of aero engine.

The engine is an inverted 12-cylinder V type, working on the two-stroke cycle, of 6 in. bore and 9 in. stroke, making the displacement 3,052 cub. in. The two banks of cylinders make an angle of 30 deg. with each other, which gives a compact power plant with minimum frontal area. In fact, the front elevation can be enclosed in a rectangle $26\frac{1}{2}$ in. wide by $49\frac{9}{16}$ in. high. Mr. P. M. Heldt, writing in *Automotive Industries*, Philadelphia, of May 5th, 1934, states that complete with all accessories, including starter, air compressor, double fuel strainer, fuel booster pumps, fuel lines, superchargers, torsional vibration damper, safety clutch for the accessories drive and over-running clutches for the supercharger drive, the engine weighs about 2,400 lb., or 2 lb. per h.p. It works with a compression ratio of 16 to 1.

Starting is by compressed air, and means are provided for relieving the compression of either bank of cylinders. With the object of increasing the general safety factor, all important accessories are provided in duplicate, and great care has been taken to minimise trouble with the "plumbing" of the fuel and cooling systems. In fact, each bank of cylinders has an independent cooling, fuel, lubricating and scavenging system, so that the power plant virtually consists of two engines with only the crankcase and the crankshaft common to both. If necessary, one bank of cylinders could be shut off and the plane landed on the remaining bank. Each cylinder has two injection valves, supplied by individual fuel pumps, so trouble with the injection system is pretty well guarded against. The experimental engine was designed to be reversible, so as to meet the requirements for use on airships. On aeroplanes the reversing feature is not necessary, but M. Deschamps considers it valuable there, too, since it would make it possible to brake by means of the propeller in the event of an emergency landing.

From tests of a two-cylinder experimental engine of the same cylinder dimensions it is expected that this 12-cylinder engine will develop 1,200 h.p. at about 1,600 r.p.m. A normal continuous output of 900-1,000 h.p. is figured on.

Cylinder blocks and crankcase are in a single casting of magnesium alloy. The crankcase is substantially ribbed for increased stiffness, and the bearings are supported by

box girder-type partition walls. Cylinder liners are made of nitralloy steel and hardened on the inside to 900-1,000 Brinell.

It will be noticed that the exhaust collector, which surrounds the cylinder, is supported in such a way as to allow it the maximum freedom of expansion. The cylinder heads are cast in an aluminium alloy, in a single unit for each bank of cylinders.

Scavenging air is supplied by two General Electric centrifugal compressors, one for each bank of cylinders. These are driven at $13\frac{1}{2}$ times crankshaft speed, and at normal engine speed they deliver 25 per cent. more air than the displacement of the engine. Scavenging air is normally delivered at a pressure of 12 lb. per sq. in. gauge. Tests with the two-cylinder experimental engine showed that a pressure of 8 lb. gauge is required to effect proper scavenging at 1,600 r.p.m., so 4 lb. per sq. in. is available for supercharging. A butterfly valve on the air intake of the compressors enables the pilot to adjust their output.

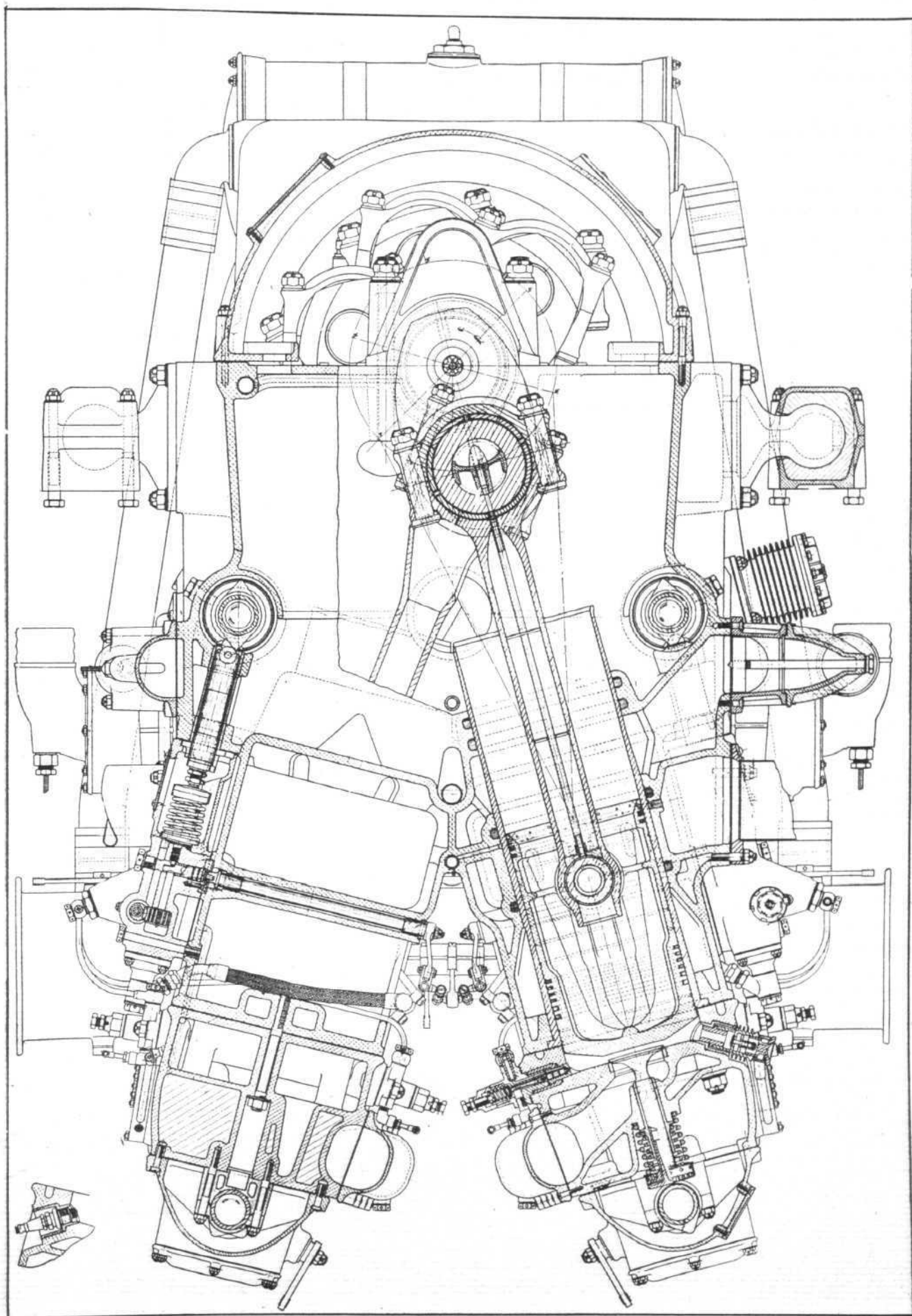
Air from the superchargers enters the cylinders through two valves in the head, which open and close in unison. Two valves are used instead of a single one to reduce the inertia and to enable the valves to open and close very quickly without excessive strain. A compression-relief mechanism enables the pilot to shift the camshaft axially, thereby bringing a special cam in line with the valves, which keeps them open during the compression stroke. An automatic locking device secures the camshaft in either of its two working positions. Exhaust gas leaves the cylinder through twelve ports at the bottom of the stroke.

A special feature embodied in the piston design is intended to prevent a trouble often experienced with two-stroke engines—that of top rings sticking, due to carbon formed by the combustion of oil on top of the piston being carried to them by the exhaust gases. To prevent this from happening, the top ring is located sufficiently low down so that it is completely covered by the cylinder walls before the exhaust ports open.

Special pains were taken to assure adequate cooling of the bridges between exhaust ports, to prevent distortion of the liner and assure long life of rings. The top and bottom edges of the ports are rounded, to prevent the rings from catching on them. Pistons are of Y alloy and are provided with deep radial cooling ribs.

One of the features of the engine, on which a patent is pending, is a method of locking the inner race of the thrust bearing without cutting a screw thread on the shaft adjacent thereto (which is always a source of weakness). A two-piece threaded sleeve is located between the inner race and a shoulder on the shaft, and the customary lock nut screws over that sleeve. When the nut is tightened

DESIGNED FOR 1,200 H.P.



THE DESCHAMPS-LAMBERT DIESEL ENGINE : Transverse Section.

up, the sleeve is being pulled against the shoulder on the shaft, while the nut ends up against the inner race, thus assuring a secure locking effect. Means are provided to prevent the sleeve from turning while the lock nut is being screwed on or off. A particularly attractive feature of the device is that the threaded sleeve need not be a close fit in the space provided for it on the shaft.

When Mr. Deschamps started the design of the engine he had certain ideas regarding the requirements to be made of the injection pump. Finding no pump on the market that met all of these requirements, he designed one himself.

The problems involved in the design of an injection pump are particularly difficult when it is intended for a two-stroke engine, because the frequency of injections is twice as great. To prevent the maximum operating speed of the engine being limited by the pump, a double pump is used for each cylinder, the cams operating the two plungers being set at 180 deg. and the pump shaft geared to turn at one-half crankshaft speed. Each cylinder has two injection nozzles, arranged opposite each other, and so that the fuel spray enters the combustion chamber tangentially instead of radially, which induces a swirling motion of the air in the chamber. The charge of fuel delivered by the pump divides between the two nozzles. Injection at two oppositely located points is said to improve the combustion, and the system in addition adds to the reliability of the power plant. In case one of the injector valves should stick, all of the fuel would be injected through the other nozzle and—the same as with dual ignition—though there would be a slight loss in power, the cylinder affected would not be cut out entirely. Also, although the pressure in the fuel line would be increased if injection were confined to a single nozzle, there would be no such extreme pressure rise as with the valve in a single nozzle on the line stuck tight.

Another difficult problem in the design of a Diesel aircraft engine is that of ensuring smooth low-speed idling. The difficulty is connected with accurate metering of the very small fuel charges required. This has been solved in the engine under discussion, the designer avers, by providing means for cutting out one of the two injection pumps provided for each engine cylinder. The result is that there is then an explosion in each cylinder at each second inward stroke of the piston, so that the engine "four-cycles." Power impulses still follow one another in the same order, vibration is not increased, all of the cylinders are kept warm and thus are ready to deliver maximum power instantly when required. This cut-out

valve can be hooked up with the main fuel-control valve.

Lubrication is by the dry-sump, pressure system throughout, except for the bearings of the forked rods. In two-stroke engines with exhaust through cylinder ports, trouble is often experienced from excessive oil consumption and smoky exhaust, due to loss of oil through the ports. This is guarded against in this engine by cutting a small horizontal groove in the cylinder liner about $\frac{1}{2}$ in. below each port, a little shorter than the width of the port. At the centre of this groove there is a $\frac{1}{4}$ in. hole through the liner, which empties into a groove cut all around the cylinder casting. The grooves in all twelve cylinders communicate through drilled passages with a central tube connecting to a vacuum pump, thus preventing waste of oil. Since the grooves below the ports are not quite so long as the width of ports, some of the oil remains on the piston, but it is carried up over the lands, so that the upper end of the liner is still adequately lubricated. The degree to which the pistons are stripped of oil can be easily regulated by changing the vacuum, which is produced by a special double-vane type of pump of constant suction.

At the rear end of the crankshaft there is a Lanchester torsional vibration damper, and this is connected with a safety coupling which protects the camshaft drive against excessive torques. The driven member of the safety coupling ends in a tubular shaft, splined at its end to take the accessories driving pinion. This pinion is not mounted directly on the tubular shaft but has a shank which is supported in two bearings, one ball, the other roller, the ball bearing serving as thrust bearing as well. At the centre of the bevel pinion there is a driving hub splined to the tubular shaft, which drives the pinion through eight coil springs, the whole assembly forming an elastic drive.

The bevel pinion referred to in the foregoing drives a vertical shaft at twice crankshaft speed, and this in turn drives a horizontal shaft from which all engine accessories are driven, through a pair of mitre gears, all the gears of this train being of the spiral bevel type.

The use of over-running clutches in the supercharger drive affords an incidental advantage, in that it protects the driving gears from excessive stresses. A Diesel engine, owing to its very high compression, stops almost instantly when the fuel is suddenly turned off. Since the compressor impellers run at as high as 21,600 r.p.m., there would be danger of injuring them by a sudden closing of the throttle, even though the impellers and the drive gears are fairly light, if the drive were rigid in both directions. The over-running clutch, of course, prevents excessive strain on the parts in that case, allowing the impellers to stop gradually.

R.Ae.C. PLUS A.A.

FOR the issue of carnets and the consideration of questions concerning air touring the Royal Aero Club and the aviation department of the Automobile Association have agreed to act jointly, and from August 1 Air Touring cards will be issued by both bodies, which will carry with them certain overseas services. This agreement for joint action will not involve any change in either organisation, and merely means that affiliated members of the R.Ae.C. and members of the A.A. will be able to obtain identical services for a small annual fee, on the payment of which

they will obtain an Air Touring Membership Card. Facilities for touring will be available at Heston Airport as well as direct from the above organisations, while arrangements are being made for similar services at Cairo, in India, and on the route to Australia. The flying maps hitherto issued by the A.A. will in future bear the names and insignia of both the R.Ae.C. and the A.A. The number of carnets issued last year show that four-fifths of the International Air Touring in Europe was accomplished in British aircraft.

A NEW COMBINATION



A Saro "Cloud" fitted with two Napier "Rapier" engines. These engines, having 16 cylinders arranged in four rows of four each and are air-cooled, develop 340 h.p. As an amphibian the "Cloud" carries 8 passengers, with a duration of either 4 hours or 5½ hours. The cruising speed is just over 100 m.p.h.

Airisms from the Four Winds

Caproni Decorated

Gianni Caproni, the Italian aircraft manufacturer, has been decorated for the services which he has rendered to the Italian aviation industry.

Gliding Centre Approved

The plans for the B.G.A. centre at Sutton Bank, which is intended as an English gliding school, have been passed by the local council.

Hull-Amsterdam Service

The first K.L.M. machine on the new North Sea service will be brought over by Commander Smirnoff on May 31, and a commemoration banquet will be given at the Guildhall on the following day.

New York to Ireland

Pond and Sabelli crossed the Atlantic in 32 hr. 4 min., but petrol feed trouble caused them to put down at Moy, County Clare, though Rome was their avowed destination.

Balloon Disaster

The *Bartsch von Sigsfeld*, Germany's largest balloon, which ascended from Bitterfeld on May 13 on sub-stratosphere investigation work, was found wrecked on the Soviet-Latvian frontier. Both pilot and observer perished.

"Macon's" Aircraft

Two single-seater Waco's are acting as tenders to the U.S. airship *Macon*. This dirigible is understood to be carrying also a number of Curtiss "Sparrowhawk" single-seater fighters.

More Hustle

Col. Roscoe Turner, flying a Wedell-Williams monoplane with a 700-h.p. Pratt & Whitney "Hornet" engine and retractable undercarriage, recently flew from Detroit to New York (560 miles), at an average speed of 315 m.p.h.

A pilot of T.W.A. Inc., flying a Northrop "Gamma" (Wright "Cyclone"), loaded with 440 lb. of freight, completed the journey from Los Angeles to New York (2,609 miles) at 227 m.p.h. One halt was made at Kansas City. Throughout the journey the pilot flew at about 15,000 ft.

A Bellanca MacRobertson Racer?

It is understood that the Bellanca Aircraft Corporation intends to build an aeroplane to compete in the England-Australia air race. The machine will be a low-wing, single-engined monoplane, with trailing edge flaps and retractable undercarriage. Fitted with a Wright "Cyclone" engine giving 725 h.p. at 6,900 ft., it is expected that the maximum speed will be 255 m.p.h. (410 km), cruising speed 235 m.p.h. (378 km), landing speed 52 m.p.h. (83.7 km), service ceiling 28,000 ft. (8534 m), and range 3,000 miles (4830 km). Delivery should be possible four months after an order is placed, and the cost will be about £8,720.



ROUNDAABOUT: Felixstowe's 50-ton crane, used to transfer flying boats from the water to the pier.

America's Latest Carrier

The new American aircraft carrier, U.S.S. *Ranger*, will be commissioned for service on May 26. Her displacement is 13,800 tons, length 727 ft., beam 80 ft., and draught 19 ft., and she will carry 72 aircraft.

Twenty-five Years Ago

From FLIGHT of May 22nd, 1909.

"On the 14th, Mr. S. F. Cody, on the discarded Army aeroplane, succeeded in making a really good flight, and set up a record for Great Britain by flying for a mile, reaching an altitude of 30 feet."

New German Air Services?

Gen. Goering and several officials arrived in Athens last week, and it is rumoured that the possibility of an extension of the German Air Services to India and the East will be considered.

Another "Pegasus" Record

Flying a Savoia 72 with three "Pegasus" engines and carrying a load of 4,409 lb. (2 000 kg), Capt. Di Mauro and Sgt. Olivari set up a new class altitude record at Montecelio Aerodrome, near Rome, by reaching a height of 26,903 ft.

Japanese "Super Fighters"

A batch of high-performance low-wing monoplane fighters has been delivered to the Japanese Army Air Force by the Kawasaki Dockyard Co., of Kobe. Fitted with a Kawasaki IX water-cooled engine of 800 h.p., the new type is credited with a top speed of little less than 250 m.p.h. Incidentally, the Japanese Naval Air Force has also adopted a new type—a deck-landing torpedo bomber known as the Type 92. This machine is replacing the Mitsubishi-Blackburn 3 M.R.4 and will soon be delivered to coast defence squadrons and to units operating from aircraft carriers.

Ambulance

Flying almost "blind" in a violent storm, the pilot and mechanic of the North Swedish Air Ambulance made a 100-mile flight from Boden to Juok-sengi, in the Arctic Circle, to pick up a sick man and a nurse, whom they brought back safely to hospital at Boden.

To Australia by Airship?

It is possible that the new Zeppelin will be used between Holland and the Dutch East Indies, and negotiations are already in progress between the Zeppelin company and the Dutch steamship interests. The possibility of extending this service to Australia is also being considered.

Miss Jean Batten

On Tuesday Miss Batten had arrived at Kupang, Timor, on her Australian flight, and it now appears probable that she will beat Mrs. Mollison's "record."

Italy and MacRobertson Race

It is reported that Italy will enter a machine for the England-Australia race, and that this will be piloted by Lombardi and Suster.

Viceroy Flies Home

Lord and Lady Willingdon arrived at Brindisi on May 19 after their journey by Imperial Airways from India.

Woman's 17,000-mile solo Tour

Flying a "Wasp"-engined Lockheed "Air Express," Miss Laura Ingalls completed a 17,000-mile trip in Central and South America in eight weeks. This is probably the longest solo flight ever made by a woman, and the Lockheed is a "man's aeroplane."

Guggenheim Medal for Boeing

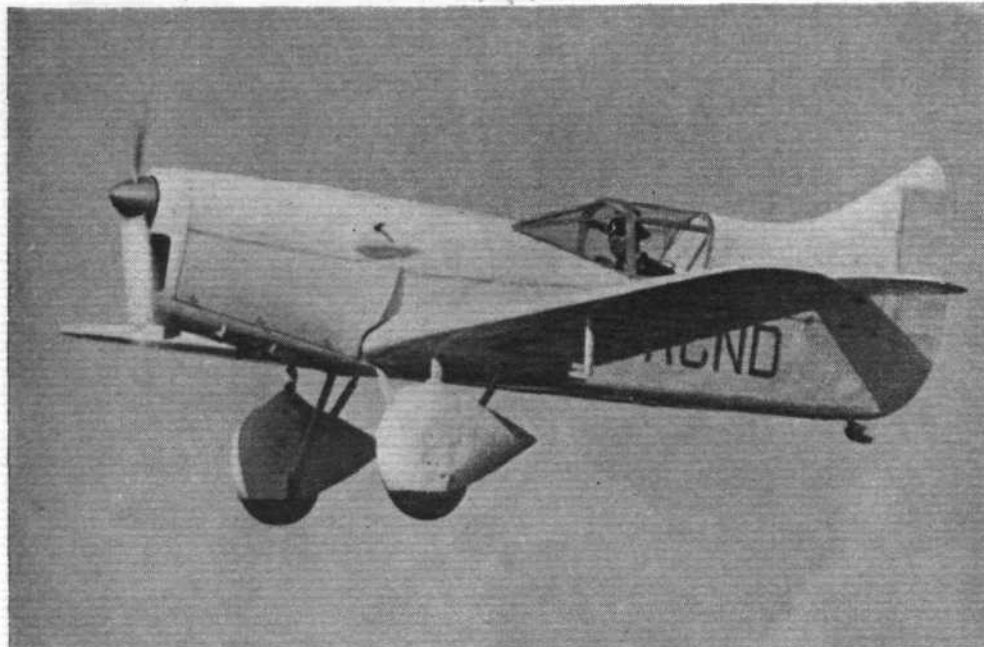
Mr. William Edward Boeing, founder of the Boeing Airplane Company, of Seattle, and of the San Francisco to Chicago division of United Air Lines, has been awarded the Daniel Guggenheim Medal for achievement in aircraft manufacture and in air transport.

Pan-American Profits

Pan-American Airways has announced a net profit of £174,500 for the year ending December 31, 1933.

This "Air Strength" Business

It is distinctly curious that the U.S. should, according to an aircraft industry manifesto, consider that she "lags behind other Powers in air force strength," when we regard her as being unusually well equipped.



PRINCE GEORGE'S ENTRY: The Percival "Mew Gull" which will be flown by Mr. Percival in the King's Cup Race. (FLIGHT Photo.)

Junkers in South Africa

Mr. Pirow, the South African Minister for Defence, has been severely criticised for his proposal to purchase German aircraft to the value of £85,000. In answer to this criticism it has been stated that Junkers aircraft have been used with great satisfaction by Union Airways (now under Government control), and that large stocks of spares are on hand.

U.S. Bomber Competition

Bids for eighty twin-engined bombers, to be delivered early in 1935, have been called for by the U.S. Army Air Corps. The machines are to have a top speed of at least 200 m.p.h. at 10,000 ft., to which height they should climb in ten minutes, and a service ceiling of 20,000 ft. A crew of four to six men, three machine guns, and a bomb load of 2,000 lb. are to be carried. An endurance of six hours with half load has been demanded.

By Air to Gretna

An Air Ministry civil aerodrome licence has been obtained by the family owning the famous Smithy at Gretna Green.

Masonic

The newly-formed Masonic Country and Flying Club is shortly to open a charming clubhouse near Brooklands Aerodrome. The flying club has placed an enclosure and park at their disposal for the display of June 2. Tickets can be obtained from the Secretary, Mr. N. W. Harper, 49, Queen Victoria Street, E.C.4.

Palestine Aerodrome

A landing ground has recently been opened near Lydda, between Jerusalem and Jaffa, and the authorities will authorise an expenditure of £8,000 for concreting runways and for buildings.

Looking at America

Messrs. R. K. Pierson, T. C. L. Westbrook, and J. Summers, of Vickers (Aviation), Ltd., are at present in the United States making a study of American commercial aviation.



A NEW HOME: The works of the de Havilland Aircraft Co. at Hatfield are fast approaching the stage when it will be possible to leave Stag Lane to the builders. The service department is already at the new aerodrome. (FLIGHT Photo.)

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

BRITISH INTERNATIONAL AIR MAILS

Highland Airways to Carry the First "Official" Mails

IT is announced that the first "official" inland air mail in Great Britain will come into operation at the end of this month, when letters will be carried on the Inverness-Kirkwall (Orkney Is.) service operated by Highland Airways, Ltd. This will be in the nature of an experiment, and should it prove successful the Post Office authorities will consider the question of extending the carrying of mails in other parts of Great Britain.

We understand that there will be no extra charge for letters carried on the Orkney service, but for the present only ordinary letters will be carried.

The service will connect at Inverness with the mail trains to and from the south, and its use will speed up the service by a day or more between Kirkwall and London, while it will give a much later posting and a much earlier arrival between Glasgow and Edinburgh and the Orkneys.

The new mail service will be inaugurated by the Director of Postal Services, Sir Frederic Williamson, at Inverness, and Sir Frederic will accompany the mails on the initial flight—the first time the Director of Postal Services has ever visited the Orkneys.

Highland Airways' new service between Aberdeen and Kirkwall, via Wick, was inaugurated on May 7 at Seaton Air Park, Aberdeen, in the presence of Lord Provost Alexander, whose wife christened the first machine *Aberdeen*. The service is a daily one and takes about 1 hr. 45 min., the fares being £3 5s. single and £5 10s. return. It is hoped to commence a weekly service to Shetland during July, August and September. Highland Airways' fleet now consists of two seven-seater "Dragons," one four-seater "Monospar," and one "Gipsy Moth," the pilots, in addition to Capt. Fresson (the managing director) himself, being Messrs. Greenshields and E. H. Coleman.

SPEED OR COMFORT?

Is comfort, in American commercial aircraft, being sacrificed for speed?

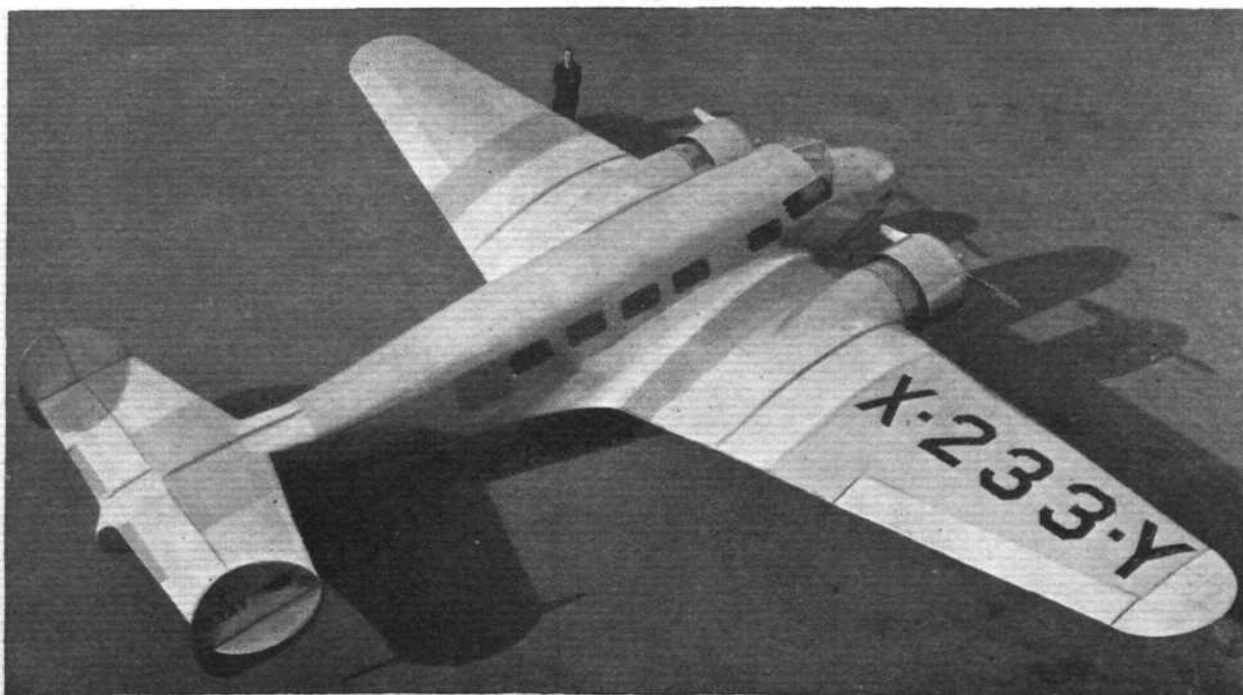
NOW that several high-speed American commercial aircraft are being put into service in Europe, we hope to hear of how their actual performance compares with the figures published by their manufacturers. There exists a considerable amount of doubt in the minds of many European aircraft designers regarding the accuracy of these figures. It would appear, however, that the figures for some of the better known and more widely used types are not so highly exaggerated as is sometimes alleged.

The French Air Ministry recently ordered a Lockheed "Electra" (two Pratt & Whitney "Wasp Juniors"), an aircraft which is claimed by its manufacturers to have a top speed of 221 m.p.h. and a cruising speed of 203

m.p.h. at 10,500 ft. The estimated cruising speed was only 190 m.p.h.

M. Wibault, the French aircraft constructor, discussing the subject in a recent interview, prefers to keep an open mind regarding the performance of the "Electra," but draws attention to the fact that a single-engined aircraft belonging to Capt. Frank Hawks (probably the "Travel Air R."), for which a top speed of 250 m.p.h. was claimed, developed a speed of only 216 m.p.h. when tested at Villacoublay, the French Martlesham.

In comparing the latest Wibault commercial type with the "Electra," and discussing the reasons for the difference in the performance of the two types, M. Wibault empha-



A SPEEDY EXAMPLE: The Lockheed "Electra," operated by certain American airlines, has a top speed of about 220 m.p.h. Although, compared with other types, the accommodation is somewhat cramped, the cabin is by no means uncomfortable.

sises the fact that, according to French regulations, the minimum total width of a fuselage for a machine with conventional seating arrangements is 5 ft. 7 in. The width of the fuselage of the "Electra" at the position of the last two chairs is 4 ft. 5 in. Similarly, the height of the Wibault fuselage, measured between the floor and the ceiling at the position of the door, is 6 ft., while the corresponding figure for the "Electra" is 4 ft. 5.5 in. The distance between the backs of the seats, and the general ease of entry and movement, are considerably greater in the Wibault than in the "Lockheed."

From these remarks one must not jump to the conclusion that all fast American machines are cramped and uncomfortable. The improved Curtiss Wright "Condor" (two Wright "Cyclones"), with N.A.C.A. cowlings and lengthened nacelles, is claimed to have a top speed of 190 m.p.h. and a cruising speed of 160 m.p.h. Readers may judge from the photograph already published in FLIGHT of the interior of the "Condor" that this machine is exceptionally roomy. For night travelling the sleeping berths are actually 1 in. longer than those of the American sleeping cars, and each is high enough to permit sitting up. We very much doubt, however, if there are any machines

in the world quite as comfortable as our own H.P. 42 and Short "Scipio" type. M. Wibault points out how popular the H.P. 42's have become because they are comfortable, and Mr. Anthony Fokker, although not greatly impressed with the aerodynamic design of large British aircraft, "hands it" to us for the comfort and silence provided in these machines.

There still remains in this country an idea that a very large aircraft is, of necessity, a slow aircraft. If one can believe the reports which state that the top speed of the Sikorsky S.42 (four Pratt & Whitney "Hornets"), which has a span of 114 ft., is 182 m.p.h., it seems that this theory has been struck a serious blow. It is expected that the big Martin boat under construction for Pan-American Airways, when fitted with four 800-h.p. Pratt & Whitney "Twin Wasp" engines and carrying 48 passengers and a crew of five, with fuel capacity for a range of 3,200 miles, will cruise at about 145 m.p.h. The Martin Company have prepared plans for a cantilever monoplane flying boat of 100,000 lb. gross weight, with a span of about 180 ft., which should cruise at between 150 and 180 m.p.h. on 7,000 h.p. obtained from four engines. The range should be 5,000 miles.

PROGRESS AT HOME AND ABROAD

A ROYAL AIR MAIL PENNANT

THE Postmaster-General has instituted a Royal Air Mail pennant, which may be flown by aircraft carrying mails and will be analogous to the Royal Mail pendant carried by mail boats. The Royal Air Mail pennant is blue, with a yellow device consisting of the Royal Crown over a post-horn. The device is surrounded by the words "Royal Air Mail" in white. The length of the "fly" is twice the length of the head. Only aircraft of companies having



a contract with the Postmaster-General to carry mails will be permitted to fly the pennant, and it may be flown only while such aircraft are actually employed on the carriage of mails. The pennant may also be flown on or in proximity to buildings belonging to Air Mail contractors at which air mails are embarked or disembarked. The Postmaster-General will present the first Royal Air Mail pennant to Imperial Airways at a ceremony to be held next Saturday at Croydon Aerodrome, and Sir Kingsley Wood will hoist the flag on the air liner leaving Croydon on that date with the Indian air mail.

PAN-AMERICAN IN MEXICO

A THRICE-WEEKLY air service between Los Angeles and Mexico City is to be operated from April 25 by Pan-American Airways.

SCADTA AND UMCA CO-OPERATE

A FAST air service has been inaugurated between Panama and Colombia by the SCADTA Company and the Uraba Medellin & Central Airways (UMCA). The latter company carries mails and "express" from Medellin to Bogata and Cali, while the Medellin-Panama service is operated by SCADTA.

NEW JUNKERS FOR OLD

SEVEN single-engine Junkers F.13's and three three-engined Junkers G.24's, all equipped with Junkers L-5 engines, which have been used on the Adriatic and Albanian service of the Societ  Aerea Mediterranea, have been taken over by Deutsche Luft Hansa. In exchange, S.A.M. will receive three triple-engined Junkers JU 52/3 m's. The company has decided to use only multi-engined machines on its services, and with the exception of the three JU-52's already mentioned no more foreign aircraft will be ordered.

AIR TRAFFIC IN THE U.S.S.R.

ACCORDING to a report from a reliable source, 41,000 passengers, 3,745,000 lb. of mail and 1,938,000 lb. of freight have been carried by air in the U.S.S.R. during 1933. It is hoped this summer to increase the airway mileage by 20 per cent., which will make a total of 27,950 miles. This extension should result in an increase of traffic to 60,000 passengers and of air mail to 6,610,000 lb., during 1934. A number of improvements in the passenger air lines between Berlin and the Soviet Union, including a considerable reduction of fares, has been announced by "Dereluft." On May 1 regular flights were started between Moscow and Berlin, taking 11 hours, and Berlin-Leningrad, via Esthonia, taking 10 hours.



A LARGE VISITOR AT JERSEY: Last week we illustrated the British Air Navigation Co.'s Tri-motor Ford, *Voyager*, at Heston prior to its departure for Jersey. The above picture was taken on the sands at Jersey after its arrival.

AN AERIAL SIGNPOST: Mr. Ernest Pitman, of Bath—a pioneer of amateur flying—has had, at his own expense, the lettering "Bath" painted on the largest gas holder at the Bath Gas Works, as shown on the right.

ROME-MARSEILLES SERVICE

ON May 1st a fast air service commenced weekly operation between Rome, Marseilles and Barcelona. Connection is made with Air-France services to Lyons and Paris. The route is being operated by the S.A.M. Company with triple-engined Savoia Marchetti S.66 flying boats.

GERMAN AIR MAIL RATES

A NEW scale of charges for the carriage of air mail has been published by the German Postal Administration. The air mail surtax for all European countries, with the exception of Russia, will be RM. 0.15 instead of RM. 0.20. Similar reductions are foreseen for the carriage of air mails to other destinations.



CROYDON

THE Imperial Airways *Scylla* made her maiden trip to Paris last week, under the command of Mr. "Jimmy" Youell. She was described in most of the newspapers as the "Flying Hotel," an exaggeration which merely leads to disappointment when people see this magnificently equipped machine. It has been thus with the reporter ever since the day ridicule was thrown on commercial aviation by the term "air liner," which was first applied by some pressman to a de Havilland 16. *Scylla* is the very last word in passenger comfort and spaciousness, and service of meals has been greatly facilitated. A steward told me that the gangway in which two men may pass each other with ease has the possible disadvantages in rough weather that it may be too roomy for a steward accustomed to assist his balance with the arms of the chairs in the narrower gangways.

Air-France had another bit of bad luck on Saturday afternoon, when an incoming "Golden Clipper" with seven passengers made a forced landing just outside the aerodrome boundary. Nobody was hurt, and the whole thing is merely the equivalent of a railway train bumping the buffers rather hard and shaking up the passengers. What is alarming about it is that all three engines are said to have had their petrol supply cut off practically simultaneously as the machine was coming in to land. The cause of this does not seem to be clear at present, but we may rely upon it that Air-France will get to the bottom of this failure and remedy it. A word of praise is due to the pilot, M. Defives, who handled a difficult situation extremely well. Seeing that he would be unable to clear the road, which at that point has stone-faced embankments and wooden fencing, and which, incidentally, is seldom free from fast road traffic, he put the nose of the machine down, gathered speed and landed on the far side of the road. He then pulled the "Clipper" up and over the road in the manner of one taking a stiff fence on horseback. Unluckily, he took the top off a small tree and went through the fence on the other side of the road, but he got his machine down in the best possible way and in the safest spot—with the loss of his undercarriage. When you come to think of it quietly, it was the only thing to do. The point is that the pilot had no time to think of it quietly, but had to think and act at once.

I fear I made an absurd misstatement last week about Capt. O. P. Jones' 18 miles private flying. The story

reached me in the form of miles. It should be 18 hours, of course. I feel almost as ashamed as I am sure the reporter feels who asserted, after a flight in *Scylla*, that the commander need have no fear of a descent into the Channel, because the machine is easily convertible into a flying boat—at a moment's notice and in the air, one must suppose. The real reason has escaped the scribe—it is because of the presence of four very excellent British engines. The first D.H. 86 four-engined eight-seater aeroplane was delivered to Imperial Airways on Saturday last. The pilots are greatly impressed with its efficiency and with its cruising speed of 146 m.p.h. It will be used on the Brussels-Cologne route. Internally it is beautifully decorated and extremely comfortable.

F/O. Charles Allen recently flew a photographer to the scene of the American transatlantic plane crash in County Clare, Ireland. In a "Puss Moth" he left Croydon very early in the morning and was first to arrive as well as first back at Croydon with photos. At Hahinch, the American machine was in a tiny stone wall girdled field. Allen chose the largest field near, but it was not large enough to take off again with the photographer and cameras. He flew the plates back and left the pressman who, it is understood, would not get home by surface transport under about three days.

On Thursday, May 17th, a special Swedish Fokker F.XII of the A.B. Aerotransport arrived at Croydon with the Crown Princess of Sweden on board, travelling incognito as Countess Gripsholm. So fully booked up were all the K.L.M. services for the following day that the Swedish machine, of 14-seater capacity, went back as a supplementary machine on the 13.15 Scandinavian Air Express.

Capt. Crundall, of Aircraft Exchange & Mart., Ltd., was telephoned by the owners of the ship *Isle de France* one day recently asking him to fly to Le Havre and pick up baggage belonging to Mrs. Edge, wife of the American Ambassador. It had been left on the quay at Le Havre and the *Isle de France* had left for Plymouth and New York. Capt. Crundall left Croydon 16.45 and did the trip to France and back with the luggage to Plymouth by 21.15 in time to catch the liner there before she sailed for New York. The flight Le Havre-Plymouth was over about 200 miles of water. Capt. Crundall was particularly impressed by the excellent Customs facilities afforded him at Croydon, Le Havre and Plymouth.

A. VIATOR.

HESTON

MILE. LOTFIA EL NADI, Egypt's first and only lady pilot, is paying a visit to Heston to study the flying conditions in this part of the world. Mile. Lotfia qualified for her "A" licence with Airwork's associated Egyptian company last year. Her flying experience amounts to a considerable number of hours, and she hopes to take her "B" licence shortly.

Mr. Lindsay Everard, leading a flight of four machines, disappeared last Friday morning in the direction of Düsseldorf on his annual "Rundflug."

Dr. and Mrs. Atkey returned last week from a seven-months' Continental tour in their "Moth." They had a particularly trying flight north over the mountains from Madrid, from which their altimeter has never recovered. They slipped between the peaks and the clouds with a

margin of 900 ft., and the altimeter (apparently) froze with fright and continued to register their maximum height for the rest of the journey!

On May 15, Mr. Jack Sanderson, of the Scots Guards, left Heston with Miss Sheila Adam, after their marriage in London, for an air honeymoon at Chateau d'Ardenne. They travelled in a "Leopard Moth," lent for the occasion, as a wedding present, by Mr. Roberts.

Mr. P. J. Clive, the eldest son of Sir Robert and the Hon. Lady Clive, and Miss Elizabeth Darell also left Heston for Paris on May 16, after their marriage in London, in an aeroplane piloted by Mr. A. C. M. Jackman. One of the bridesmaids, who came to see her off, was Miss Ursula Horlick, a pupil of the Airwork School of Flying.

MUNICIPAL AERODROMES

THE following is a report issued by the Air Ministry on the progress of municipal aerodromes up to April 30 last:—

Towns which have licensed aerodromes (17):—

Blackpool	Ipswich	Plymouth
Bristol	Leeds-Bradford	Portsmouth
Cardiff	Liverpool	Renfrew
Carlisle	Manchester	Southampton
Hull	Norwich	Stoke-on-Trent.
Inverness	Nottingham	

Towns which have purchased sites (7):—

Brighton	Doncaster	Rochester
Hove	Hastings	Southport
Worthing	Leicester	Walsall.

Towns which have reserved sites in their Town-planning scheme (5):—

Basingstoke	Burton	Skegness.
Blyth	Rotherham	

Towns which have had sites inspected (94):—

Aberdeen	Cromer	Kidderminster	Slough
Abergavenny	Derby	Leek	Southend
Aberystwyth	Dundee	Lincoln	South Shields
Aldershot	Eastbourne	Littlehampton	Southwold
Aylesbury	Edinburgh	Loughborough	St. Albans
Barnet	Exeter	Lytham St. Annes	Stirling
Barnsley	Falkirk	Maidstone	Stratford
Bath	Gateshead	Middlesbrough	Swansea
Bedford	Glasgow	Middleton	Taunton
Belfast	Gloucester	Morecambe	Tynemouth
Bexhill	Grantham	Motherwell	Walthamstow
Bognor	Gt. Yarmouth	Newcastle-upon-Tyne	Warrington
Bournemouth	Greenock	Newport (Mon.)	Warwick
Birkenhead	Grimsby	Newton Abbot	Wellingborough
Birmingham	Guildford	Northam, Devon	West Bromwich
Bridlington	Halifax	Northampton	West Hartlepool
Burnley	Harrogate	Perth	Weymouth
Cambridge	Harwich	Peterborough	Winchester
Cheltenham	Hereford	Poole	Windermere
Chester	Huddersfield	Ramsgate	Woking
Chorley	Huntingdon	Redditch	Wolverhampton
Colchester	Huyton	Scarborough	Worcester
Colwyn Bay	Irvine	Sheffield	York.
Crewe	Isle of Man		

Towns which have displayed interest in aerodromes other than above (74):—

Airdrie	Haverford West	Romford
Axbridge	Haywards Heath	Rugby
Bangor	Henley	Rye
Barrow	Kendal	Salisbury
Bideford	King's Lynn	Shrewsbury
Bolton	Kingston-upon-Thames	Stafford
Buckie	Lancaster	Stockport
Burry Port	Llandrindod Wells	Stockton-on-Tees
Bury St. Edmunds	Luton	Sunderland
Caernarvon	Lymington	Swindon
Caerphilly	Lynton	Thornton, Lancs.
Campbeltown	Mablethorpe	Thurso
Cannock	Merthyr	Totnes
Chesterfield	Montrose	Truro
Coventry	Neath	Wadebridge U.D.C.
Dagenham	Newtownards	Wallasey
Darlington	North Berwick	Walton-on-Naze
Dornock	Nuneaton	Watford
Dover	Oxford	Weston-super-Mare
Dunfermline	Pontypridd	Wigton U.D.C.
Durham	Preston	Winsford (Cheshire)
Folkstone	Pwllheli	Witney
Gillingham	Reading	Wrexham
Gravesend	Redruth	Yeovil.
Hamilton	Rochdale	

NEW WARSAW AERODROME OPENED

THE President of the Polish Republic opened, on April 29, a new civil and Customs aerodrome at Okęcie, Warsaw. This aerodrome replaces that at Mokotów, and will be used for the forthcoming Circuit of Europe and for the Gordon Bennett balloon competition.

AN AERODROME FOR FALMOUTH?

At a meeting of the Falmouth Trade Council on May 5, it was decided to suggest to the Town Council that a landing ground for aircraft was needed.

EDINBURGH

REPRESENTATIVES of Edinburgh and Leith Chambers of Commerce and Edinburgh Merchant Company were received recently by the Edinburgh Lord Provost's Committee, when they pleaded for the provision of an aerodrome for the city.

SIDCUP AIRPORT PROJECT

At a meeting in Sidcup last week hopes were entertained that the town would make a real effort to organise its own airport. There are, between Croydon and Canterbury, no aerodromes immediately south of the Thames, and the projected Sidcup airport would serve the district and, at the same time, be a haven for machines when other parts were fogbound. Among the speakers, Air Commodore J. A. Chamier gave an extremely interesting talk on Britain's air future, both from a civil and military angle, in which he shattered a number of popular delusions.



A NEW FLASHING BEACON AT HATFIELD: This beacon, having a range of about 38 miles, has just been installed on the roof of the clubhouse in the S.E. corner of Hatfield Aerodrome. It shows a white flashing light of point 9.2 second duration every five seconds, for one hour from half an hour after sunset.

FOREIGN AIRCRAFT



A MONOPLANE FIGHTER: The Dornier Do.C.4, which may be equipped with the Rolls-Royce "Kestrel" or Hispano-Suiza 12X engines.

DORNIER Do.C.4

An interesting Swiss monoplane two-seater fighter

ALTHOUGH at present the biplane seems to be the most popular type for use as a two-seater fighter, two or three monoplanes in this class have lately appeared. We have already described the Junkers K.47, which, fitted with the latest types of radial engines, has shown quite an astounding performance. The Do.C.4 described hereafter has a top speed of about 200 m.p.h. and an excellent rate of climb.

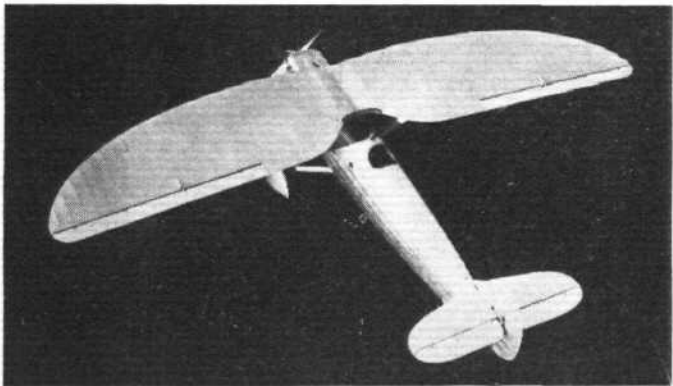
The machine is a high-wing semi-cantilever monoplane, the plan form of the wings being somewhat unusual, as may be seen from the accompanying photograph. Inboard of the attachments of the lift struts, the wings taper in thickness, improving the pilot's field of view. Three

duralumin spars are used in the construction of the wing. One of these may be shot away without making the load factors inadequate for normal flying. Frise ailerons are fitted.

Steel tubular construction is used for the fuselage, which is faired to an oval section. The *empennage* is of a conventional type except for the fact that the tail plane passes through the fin. The undercarriage is a well faired divided type.

The pilot's cockpit is beneath the cut-out in the centre section of the wing. He is armed with two machine guns mounted in the cowling. Immediately behind is the well-sheltered observer's cockpit, with a mounting for twin guns.

Any of a variety of engines may be installed, including the Rolls-Royce "Kestrel" and the Hispano-Suiza 12X type. Both the fuel and the oil tank may be jettisoned during flight.



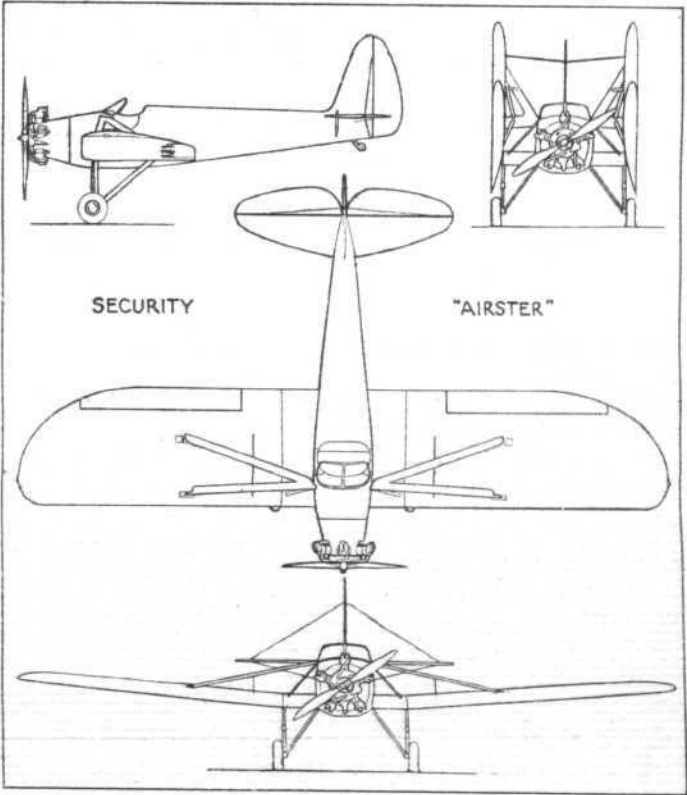
This view of the Dornier Do.C.4 monoplane shows the tapered wings.

THE SECURITY "AIRSTER"

A Light American Monoplane with side-by-side seating

MANUFACTURED by a recently-formed concern, the Security National Aircraft Corporation, of Downey, Los Angeles, California, the Security "Airster" was designed by Mr. W. B. Kinner, the president of the company.

The machine is a low-wing monoplane with folding wings



DORNIER DO.C.4			
DIMENSIONS			
Span .. .. .	.. .. .	49 ft. 2 in. (15 m)	
Length .. .. .	.. .. .	34 ft. 9 in. (10.6 m)	
Height .. .. .	.. .. .	11 ft. 2 in. (3.4 m)	
Wing area .. .. .	.. .. .	344.3 sq. ft. (32 m ²)	
WEIGHTS AND LOADINGS			
Weight empty .. .. .	.. .. .	3,520 lb. (1 600 kg)	
Disposable load .. .. .	.. .. .	1,540 lb. (700 kg)	
Weight loaded .. .. .	.. .. .	5,070 lb. (2 300 kg)	
Wing loading .. .. .	.. .. .	15 lb./sq. ft. (71.9 kg/m ²)	
Power loading .. .. .	.. .. .	10.1 lb./h.p. (4.6 kg/h.p.)	
PERFORMANCE			
		"KESTREL" III S.	"HISPANO-SUIZA" 12X.
Speed at sea level .. .. .	.. .. .	173 m.p.h. (278 km/hr)	169 m.p.h. (272 km/hr)
Speed at 11,480 ft. (3 500 m) .. .. .	.. .. .	196 m.p.h. (315 km/hr)	197 m.p.h. (318 km/hr)
Climb to 22,960 ft. (7 000 m) .. .. .	.. .. .	21 min.	18.5 min.
Ceiling .. .. .	.. .. .	29,850 ft. (7 000 m)	31,160 ft. (9 500 m)
Range .. .. .	.. .. .	500 miles (800 km)	500 miles (800 km)

of Clark "Y" section attached to stubs built integral with the fuselage. Spruce is mainly used for the wing construction, with fabric covering. The wings are braced to the top longerons by inverted "V" struts. A very neat wing folding arrangement, patented by Mr. W. B. Kinner, by which the wings may be folded in three minutes without the use of tools, is fitted. Frise type ailerons of high aspect ratio are used.

Welded steel tubular construction is used for the rectangular fuselage structure, which is covered with fabric. A roomy cockpit with individually adjustable side-by-side seats, which are designed to accommodate seat pack parachutes, is situated over the centre line of the wing. Dual controls are fitted as standard. A baggage space of six cubic feet capacity is in the fuselage. A quickly detachable hood may be fitted over the cockpit at slight extra cost. The *empennage*, like the fuselage, is made from welded steel tubes. An adjustable tailplane is fitted.

The divided type undercarriage uses oleo legs, air wheels and independent wheel brakes, which may be operated simultaneously or independently by either foot or hand controls. The tail wheel is of the full swivelling type.

Either a Kinner K.5 engine of 100 h.p. or a Kinner B.5 of 125 h.p. is fitted. In each case the engine is attached to a hinged mounting. Both the K.5 and the B.5 are five-cylinder radials, the B.5 being a slightly enlarged version of the K.5.

The weight empty is 1,197 lb. (542.94 kg) and the weight loaded 1,775 lb. (805.1 kg). With the 100-h.p. K.5 engine the top speed is 100 m.p.h. The landing speed is 35 m.p.h. (55 km/hr), service ceiling 14,000 ft. (4 267 m), and the absolute ceiling 20,000 ft. (6 096 m). This latter figure must be considered exceptionally good for an aircraft of this type, although the Everling "High Speed" figure at 13.74 is on the low side.

FOR LUXURY TOURING

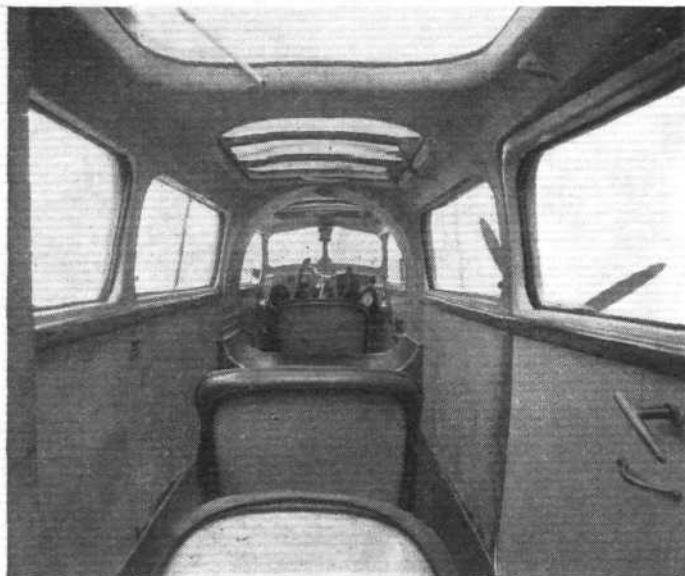
The Couzinet 101

BEARING a remarkable external resemblance to the Couzinet 70 *Arc-en-Ciel*, the type 101, one of the latest products of Avions René Couzinet, is the three-seater cabin monoplane fitted with three Pobjoy "R" engines.

The cantilever wing is of wooden construction tapering both in thickness and plan form. The leading edge takes the form of a solid spar, but the trailing edge is divided by the fuselage. Statically-balanced ailerons of high-aspect ratio are fitted.

Of typical Couzinet design, the *empennage* consists of a large fin which is formed by a deepening and thinning of the fuselage, an adjustable tail plane, elevators of the same construction as the wing and a rudder in which the smooth lines of the fin and rear portion of the fuselage are preserved. Ailerons and elevators are provided with small adjustable Flettner flaps.

A fixed split-type undercarriage is used with the wheels, which are fitted with independently-operated brakes, enclosed in large streamline fairings. The tail wheel, which is also enclosed in a "spat," is mounted in a pivoting fork.



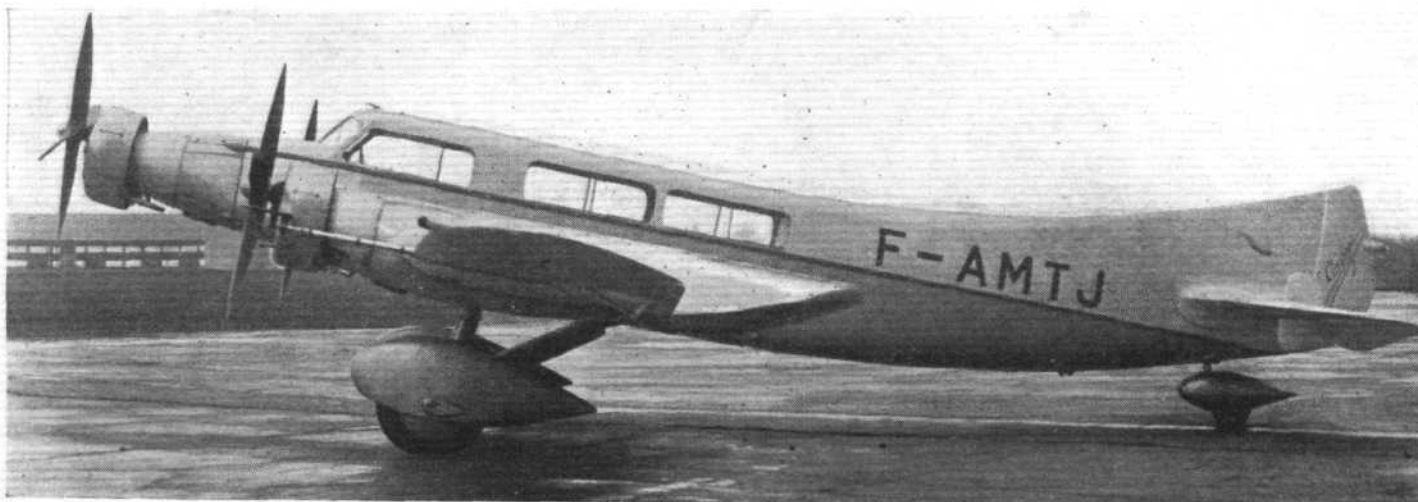
An interior view of the cabin of the Couzinet monoplane.

Accommodation is provided in the cabin for a pilot and two passengers seated in tandem. The dimensions of the cabin are:—Length 6 ft. 7 in. (2 m), width 2 ft. 8 in. (0.853 m) and average height 3 ft. 5 in. (1.050 m). Large sliding windows of safety glass, and three skylights in the ceiling, provide ample light. Heating and ventilation is controlled by the passengers.

Three Pobjoy "R" engines, on steel-tube mountings, drive four-bladed wooden airscrews. Fuel tanks with a total capacity of 66 gallons (300 litres) are carried in the wings. With three Pobjoy "Niagara" engines, using the new type cowlings developed for this type of engine, the performance of the aircraft should be considerably improved.

COUZINET 101 Three Pobjoy "R" Engines

DIMENSIONS			
Wing span	44 ft. 4 in. (13.5 m)		
Overall length	32 ft. 10 in. (10.05 m)		
Track	9 ft. 2 in. (2.83 m)		
Overall height	9 ft. 10 in. (3 m)		
Wing area	215 sq. ft. (20 m ²)		
WEIGHTS			
Weight empty	1,984 lb. (900 kg)		
Useful load	673 lb. (305 kg)		
Weight of fuel	474 lb. (215 kg)		
Gross weight	3,131 lb. (1 420 kg)		
Wing loading	14.6 lb./sq. ft. (71 kg/m ²)		
Power loading	13 lb./h.p. (5.9 kg/h.p.)		
PERFORMANCE			
Maximum speed	155 m.p.h. (250 k.p.h.)		
Cruising speed	137 m.p.h. (220 k.p.h.)		
Climb to 3,280 ft. (1 000 m)	3 min. 4 sec.		
Climb to 6,562 ft. (2 000 m)	6 min. 48 sec.		
Absolute ceiling, fully loaded	20,670 ft. (6 300 m)		
Service ceiling	19,029 ft. (5 800 m)		
Service ceiling, with one engine stopped	11,811 ft. (3 600 m)		
Range at cruising speed	550 miles (885 km)		



A FRENCH TOURING PLANE: The Couzinet cabin monoplane powered with three Pobjoy "R" engines.

From the Clubs

Events and Work at the Clubs and Schools

LINCOLNSHIRE

During the past fortnight 34 hours have been put in at Waltham Aerodrome, with two first solos.

MIDLAND

Bad weather reduced the club flying at Castle Bromwich to a total of 25 hours during the week. Flt. Lt. N. Comper, with "Mouse," was one of the week's visitors.

LIVERPOOL

Despite the rain and high winds which appear to be part of the daily programme at Hooton, some 42 flying hours have been put in, including cross-countries to Bristol and Castle Bromwich.

YORKSHIRE

Fifteen hours were flown by the Yorkshire Aeroplane Club at Yeadon during the past week. Mrs. J. R. Micklethwaite left in her "Moth" with Miss Hey to spend the Whitsuntide holidays in Austria.

CAMBRIDGE

Three new pupils joined Marshall's Flying School during the week, and, in spite of strong, gusty winds, 41 hr. 10 min. were flown. Two Miles "Hawks" were delivered to new owners.

NORTHAMPTONSHIRE

The club has entered a team for the inter-club contest at Doncaster on May 26th, consisting of Messrs. G and J. Linnell, and Mr. E. T. Dawson. High winds have curtailed flying during the week, and the outstanding event was the visit of the German tourists who were entertained by the Chairman, Capt. G. R. D. Shaw.

BROOKLANDS

Good weather has led to a big increase in flying hours this week, the total time being 95 hr. 20 min. New members are still pouring in. Mr. Adrian Boyd went solo on Tuesday in his newly-acquired "Avian" and Mr. Gogte has completed his blind-flying course. Mr. R. Ashton, the cross-country and navigation instructor, has been kept busy and numerous cross-countries have been carried out. The aerodrome will be closed for the At Home on June 2nd.

HANWORTH

More than sixty hours were flown on Club machines during the week ending on May 18th. Two members completed their "A" licence tests, and one of them, Mr. J. Dampney, who is continuing his training in order to take his "B" licence, made a cross-country flight to Shoreham. On Saturday a party from the West Middlesex Section of the Cyclists' Touring Club paid a visit to the aerodrome and were given joyrides.

READING

A very successful Dawn Patrol was held at Woodley on Whit-Sunday. Of the 27 Whit-Sunday "raiders" from Brooklands, Herts and Essex, Hampshire, East Anglian, Nottingham and Portsmouth, only eight got through undetected. Whilst breakfasts were being served there were 39 machines on the aerodrome.

Arrangements for the Garden Party are now complete. Events commence with an arrival competition and there will be demonstrations by various manufacturers and agents, a display of aerobatics by Mr. T. C. Sanders (P/O., R.A.F.), who learnt, incidentally, at the Phillips & Powis School in 1930, a visit by No. 600 City of London (B) Squadron, the annual Ladies' Race for the "Lord Northesk" Challenge Cup, and a Concours d'Elegance for visiting aeroplanes. During the afternoon Mrs. Elise Battye will be running a cocktail bar, the profits therefrom to go to the Flying Scholarship Fund which she suggested. Lord Wakefield of Hythe has most generously given £15 to the fund. Ladies are reminded that entries for the Northesk Cup Race close on Friday, June 1st. In addition to the Challenge Cup there will be a replica and a cash prize of £5.

HAMPSHIRE

Three machines from Eastleigh went over to attack Reading on Whit-Sunday, and two licences have been obtained during the week, in which 57 hr. 35 min. have been flown.

CARDIFF

A flying scholarship scheme is being run for the benefit of the social members of the Cardiff Aeroplane Club. 25 hr. 30 min. were flown during the week, including cross-countries to Desford, Leicester and Scotland, and one new flying member has joined.

GATWICK

As a high wind on May 6th prevented landing instruction at the B.A.T. School, navigation was studied with Mr. Bulstrode on a "Puss Moth." Two pupils from Imperial Airways have started "B" licence instruction, and both have now "soloed." The Baird Television Company has formed a club with the school and nine members have commenced instruction. 95 hr. 40 min. were flown during the last fortnight.

BRISTOL AND WESSEX

The charge for dual instruction at Whitechurch has been reduced from £2 10s. to £2 an hour, and the club is engaged at present in sorting out the hundred or so applicants for the three scholarships given by a local paper. Fifty have already been "air tested." The annual general meeting will be held at Bristol Airport on June 19th at 5.30 p.m.

RANGOON

A flying school, under the auspices of Indian National Airways, Ltd., was opened on April 13th, at Mingaladon Aerodrome, Rangoon, and started operations with one "Gipsy I Moth" and with Flt. Lt. C. E. F. Arthur as chief instructor. Within a month a total of 54 hours had been flown in school work, and one charter flight to Bassein had been undertaken. Another machine is now on the way. There is no entrance fee and the rates are Rs. 44 per hour dual or solo.

HATFIELD

The new "Tiger Moth" has now been delivered to the London Aeroplane Club, and this will take the place of a "Gipsy Moth," which is being sold. Furthermore, a nine-hole putting green is being laid down! Four new members have joined this week, and the most interesting "visitor" was a "Waco" piloted by Mr. White. Quite a number of visitors, incidentally, come over specially to use the swimming pool.

During the week-end before Whitsun, 50 hours were flown by members, and the total for the week is 96 hr. 30 min. Last Friday, of course, the M.C.C. London-Edinburgh trial started from Hatfield Aerodrome. The R.A.F. Flying Club put in 28 hr. 45 min. during the week.

NORFOLK AND NORWICH

H.R.H. the Duke of Gloucester arrived by air on Saturday morning, piloted by Flt. Lt. E. H. Fielden, in the Prince of Wales's "Dragon," for the Jamboree at Costessy, and in the afternoon H.R.H. Prince George arrived and spent a short time in the clubhouse before flying to Bircham Newton, for Sandringham, with his brother.

On Whit-Monday Mr. J. Collier flew to New Buckenham to give a display of aerobatics at the British Legion Fête.

There have been an extraordinary number of applicants for the scholarship scheme which was started last summer, and the list of winners is now complete. A fortnight ago the winner of the first, Mr. James Hardy's, scholarship obtained his "A" licence, and the other lucky ones will soon be on their way. Mr. A. Augood won that presented by Mr. A. N. Holmes for the employees of Edwards & Holmes; Messrs. D. G. Riches and H. C. Harrison respectively won those presented by Messrs. Boulton & Paul and by the General Manager, Mr. J. Carter; and the J. C. Colman scholarship was won by Mr. Alan Stuart.

LONDON GLIDING CLUB DINNER

The Year's Progress Outlined and Some Hopes for the Future

GLIDING enthusiasts are naturally proficient in the detection of thermal currents. Perhaps that is why the speeches at the London Gliding Club dinner held on Thursday last were noticeably free from "hot air." The gliding movement being at a critical point in its development, the speeches were often conjectural, but judging from reports of the Club's recent progress and from the obvious enthusiasm of every member, there should arise, in the future, few difficulties which cannot be overcome.

This was the first dinner held by the Club. It now seems probable, however, that the function will be held annually.

Capt. A. G. Lamplugh, the Chairman, proposed the health of the London Gliding Club. He was of the opinion that the Club did not want much publicity. It had achieved, for the gliding movement, as much, if not more, than anyone else, and politically it was on the verge of greater things. The whole gliding movement in the country was centred around the London Gliding Club.

Maj. H. Petre, in responding, agreed with Capt. Lamplugh that, at the present moment, there was a revival of gliding, and he thought that this would continue. Several members of the Club had put up exceptionally fine performances, and these efforts would have made practically no difference were it not for the fact that the press had made them known throughout the country in the right way. The Club had had a fortunate press with no undesirable sensationalism, and that, in fact, had let people know that gliding was a practical proposition. Maj. Petre commented on the flights of Mr. Collins, who had shown the way to proper soaring as opposed to "flying up and down a ridge," and to Mr. Humphries, Mr. Wills and Mr. Mole. The Club's success had been due to two main things. Firstly, the Club had been started on the right

lines, and, secondly, members had realised their responsibilities. Maj. Petre then went on to explain in detail exactly what the members *had* done, and then described how the Club had erected a hangar at Dunstable. The work was taken in hand by all the members of the Club on a Saturday when it snowed, and they had also constructed the club-house. In discussing the question of records, Maj. Petre mentioned the great difficulties encountered in making preparations for a record attempt. He said that Mrs. Dent, who had presented a cup in memory of her husband, desired the committee to use this as they thought best, and, in view of the fact that Mr. Dent had been an advocate of high efficiency in flying, it had been decided to make the cup a challenge cup and to award it to the member who, in the opinion of the committee, made the most meritorious flights during the year.

Mr. Sebert Humphries explained that he did not mind supporting Maj. Petre, especially from the back seat of his "Puss Moth." He spoke of the excellent work of Maj. Petre and Mr. Marcus D. Manton, and advocated "steady, decent, sober flying." Spectacular stunts, he said, were not quite the thing. He regarded the Club as a "happy band of pilgrims," but feared that it might be spoiled by the cheap press. He implored the members of the Club firstly not to be led astray by newspapers and secondly to hold the dinner annually.

Mr. Dudley Hiscox, in proposing the toast of "The Visitors," referred to the presence of Sir Gilbert Walker, who, he said, was "responsible for the weather in India for 21 years."

In his reply, Sir Gilbert Walker spoke of the connection of the London Gliding Club with the Imperial College Gliding Club, and thanked the members for their valuable assistance and advice.

WIRELESS NAVIGATION AT HAMBLE

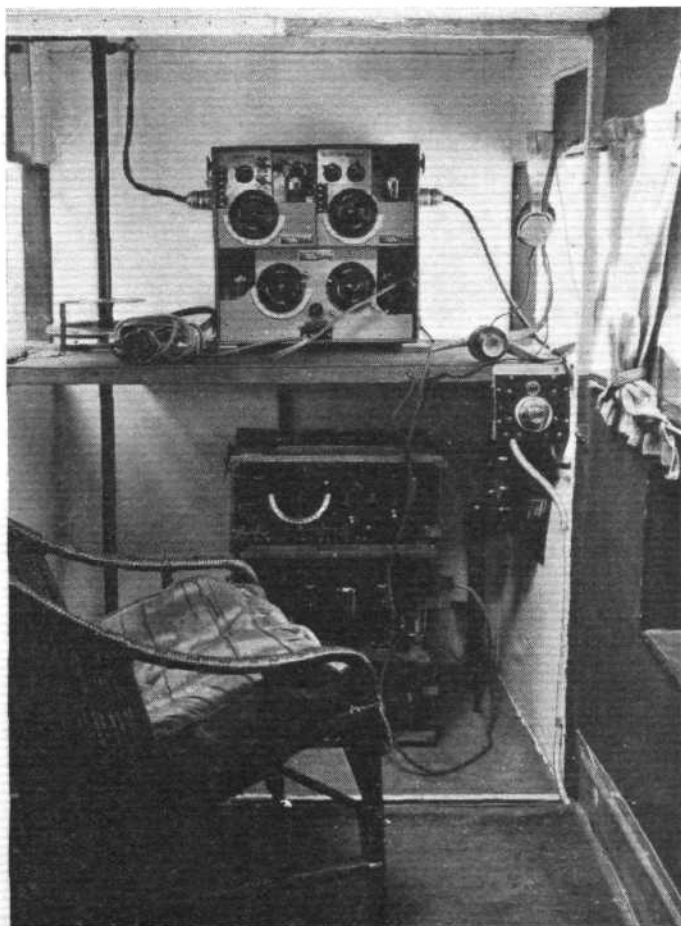
How Direction Finding Work is Taught at Air Service Training

PROBABLY the more observant readers noticed the rotating loop above the fuselage of the Avro Five in the photograph of the A.S.T. formation in the issue of May 10. This visible evidence of wireless training development requires a little explanation.

A Marconi A.D.35 receiver has been installed in the machine, with a frame aerial and details designed by the staff at Hamble, so that pupils may obtain instruction in the very necessary use of navigational D/F. Accurate bearings can be taken on any identifiable station—the coast beacons being particularly useful—and ranges up to two hundred miles are possible. The 180 deg. uncertainty present with a rotating loop has been eliminated by the use of a trailing aerial.

The actual navigational equipment includes a drift sight, hand bearing compass, Bigsworth chart board and table, and, of course, the necessary calculating instruments. During instructional flying, the instructor himself acts as first pilot, and the four pupils act respectively as second pilot, wireless operator, and navigators. Each pupil may be called upon, during a long flight, to perform one of the duties in which he is taking instruction. Furthermore, as the flying is divided between four, the expense becomes quite small for each individual.

There is clearly a limit set to the number of converging aeroplanes which may be dealt with by a single ground station, so the onus of the work is likely to fall more and more upon the crew of each machine. The special training can therefore be considered as extremely useful if not essential to the pilot of the future.



The equipment fitted in the Avro Five used by Air Service Training for wireless instruction.

Book Reviews

"The Scarlet Angel." By Alban Ali. (Duckworth & Co., Ltd.). Price 10s. 6d. net.

PEOPLE who are interested in the more serious affairs of life and the world at large and who at the same time have been bitten by the aviation "bug," will enjoy Alban Ali's book. Primarily it is a racy story of a private owner's experiences in Assam, India, and during an attempt to fly back to England in a Pobjoy Comper "Swift"—the "Scarlet Angel" of the title.

But the book does not by any means deal solely in flying experiences, though the author enters for the Viceroy's Cup on the way home, manages to put up second fastest time of the day, and finally "cracks up" near Cairo. Life among the headhunters in Assam, and life in India are described in delightful vein, and when opportunity offers Mr. Ali is just as entertaining while discoursing on tribal customs or while in an historical and archaeological mood. He visits Ur of the Chaldees, is entertained by the Maharajah of Jodhpur, and amuses himself very thoroughly in Cairo.

Not the least attractive part of the author's manner is his little way of criticising institutions by implication rather than by studious underlining. The reader is made to feel that, for instance, the marriage and social customs of the Naga tribes are considerably more rational than our own.

"My Air Armada." By Air-Marshal Italo Balbo. Translated by Gerald Griffin. (Hurst & Blackett, Ltd.) Price 18s. net.

TO the earnest student of aviation Air-Marshal Balbo's book will be something of a disappointment, but to the layman it will be sheer joy from cover to cover. The story is told with emotion and with an ingenuous freedom from reserve; it is, in fact, a mirror of present-day Italian fervour. The pictures conjured up are real, whether of

the triumphant, almost tearful, progress from fête to fête, of the crushing effect of long "hops," of aching muscles in the attempt to hold formation under bumpy conditions, or of long hours spent in and above the clouds.

The reader is made to see just how the comparatively fabulous cost of the flight can be justified to a growing state in a world that has forgotten the international ideal. If intense nationalism is childish, then men of Balbo's calibre have coloured the childhood very prettily. Some day man will be prepared to do as much for Man, and not only for a corporate state. Yet the mission of the Armada is given as one of "civilisation, peace, international brotherhood." Thus far has humanity progressed.

Of the personal side, the reader is given more than enough. The selection of the crew, for instance, provides a fascinating study of the workings of the mind of a leader, and no further light is shed on the extraordinary fate of Col. Umberto Maddalena. He disappeared entirely and without trace after the crash of his machine before the start of the cruise. He was a personal friend of Italo Balbo.

But "My Air Armada" tells us practically nothing of the machines, of the provision of necessary meteorological information, or of the reasons for the accidents and incidents during the cruise. One is left to guess that the full load take-offs were carried out at speeds in the region of 80 m.p.h., and that the Savoia-Marchettis were not by any means the easiest machines in the world to handle on the water—whatever they were like in the air. However, they proved their practicability in other directions. After all, some of the "hops" were very long, and the Alps over which the formation flew are not foothills.

The book is one that is well worth a place in the shelves, if only because it can be enjoyed when picked up for a few moments, and the translator deserves more than praise for his work. He must have succeeded in following very closely the spirit of the original.

Correspondence

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

NEW EVENTS IN R.A.F. DISPLAY

[1928] I was interested to learn, in the current issue of FLIGHT, that the R.A.F. Display Committee is staging a competition for "New Events" in connection with the Display.

Although not eligible personally (it is 15 years since I left the Service) I have frequently thought that a "Fly Past" of "Old Timers," say, in historical order of R.A.F. (or R.F.C.) adoption would be of surpassing interest. Something on the lines was suggested by the inclusion, three years ago, of the old Blériot Channel Flyer.

There are surely a few types representative in existence capable of reconditioning for this purpose, and a procession of these, immediately preceding the Parade of Experimental Types would be a big attraction.

Romford, Essex.

H. S. ELLINGWORTH.

RE PETROL TAX

[1929] It has been argued on several occasions that the petrol tax imposed under the Finance Act of 1928 of 8d. per gallon (two separate taxes at different times—see Finance Act, 1928, Chap. 17, pages 2 and 3), as borne by aircraft, is mainly utilised for the Road Fund, and as these do not make any use of the public highways, it is contended by this Association that so far as aviation is concerned, the tax is unjust and a serious incumbrance on a young industry.

It must be in the interests of any Government to assist aircraft operators, both great and small, and give them every facility to put their organisations upon a profitable basis at the earliest opportunity, so that they may take their proper place in the co-ordinated transport services of this country.

Another aspect of the matter is that the same Act provides exemption from the tax for fishing boats, so that the argument of contribution by reason of usage is adopted in that case. This reminds one that merchant shipping played a very important part in the late war, and, having regard to our inferior position in air power compared with other nations, it should be open to the Government (and I make this statement without party feeling of any description) to call upon air line operators for transport services or a reserve force in case of emergency. This they will not be able to do unless a profitable air transport industry can be built up.

Needless to say, you will readily recognise the importance of my argument, and I hope you will give same publicity in your columns.

A. HIRST, Secretary.

The Air Transport Association, Ltd.

London, W.1.

REDUCE THE AIR MAIL RATES

[1930] Everyone with foresight will endorse Rear Admiral Sueter's letter in your current issue, but some may regret that the Parliamentary Air Committee did not go a step farther and ask the Postmaster-General to have all first-class mail matter for the Empire to be sent by air, even if the present postal charges have to be doubled.

As for air mail stamps, why not cancel the present unsightly air mail labels and print instead an attractive stamp, to be issued gratis. The cost would not be great, and until all letters go by air as a matter of course, would be a good advertisement.

WALTER L. NAYLOR.

London, W.2.

THE ROYAL AIR FORCE



London Gazette, May 15, 1934.

General Duties Branch

The follg. are granted permanent commissions as Pilot Officers on probation with effect from and with seny. of April 30: 362962 Sergt. C. G. R. Lewis, 364864 Sergt. A. F. Johnson, 364915 Sergt. V. E. Maxwell, 365652 Sergt. A. W. B. Barrett.

Wing Comdr. E. L. Howard-Williams, M.C., is seconded for duty as Inspector, Iraqi Air Force (May 5); Flying Officer W. F. Hilchie is transferred to the Reserve, Class C (April 11); Lieut.-Comdr. A. O. Watson, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to naval duty (March 8, 1933) (substituted for the notification in the *Gazette* of March 21, 1933); Acting Pilot Officer on probation S. G. White resigns his short service commission (May 14).

Medical Branch

Flight Lt. (Hon. Squadron Ldr.) J. W. H. Steil, M.B., C.M., relinquishes his temporary commission on completion of service and is permitted to retain the honorary rank of Squadron Ldr. (April 30).

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

C. H. E. Coles is granted a commission as Flying Officer in Class A (May 15); R. T. Needham is granted a commission as Pilot Officer on probation in Class AA (i) (May 15); Flight Lt. J. E. A. Hoare, D.S.C., is transferred from Class A to Class C (May 1); Flying Officer A. N. Francombe is transferred from Class A to Class C (March 15, 1933) (substituted for the notification in the *Gazette* of July 11, 1933).

The follg. Flying Officers are transferred from Class A to Class C:—J. Stanley (April 20); J. McCosh (May 1); A. Mackenzie, W. Cameron (May 15).

The follg. Flying Officers relinquish their commissions on completion of service and are permitted to retain their rank:—J. D. Parkinson (Oct. 9, 1933); R. G. Mollard (April 4).

Pilot Officer J. McA. Allan relinquishes his commission on completion of service (April 27).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain: J. B. Graham, M.C., A.F.C., to Headquarters, Coastal Area, Lee-on-the-Solent, 7.5.34, on appointment as Senior Equipment Staff Officer, vice G./Capt. F. E. T. Hewlett, D.S.O., O.B.E.

Wing Commanders: E. B. Rice to R.A.F. Depot, Uxbridge, 7.5.34, whilst attending course at Senior Officers' School, Sheerness. E. L. Howard-Williams, M.C., to Special Duty List, 5.5.34, on appointment as Inspector, Iraq Air Force.

Squadron Leader: H. W. Evens to R.A.F. Depot, Uxbridge, 7.5.34, whilst attending course at Senior Officers' School, Sheerness.

Flight Lieutenants: A. C. H. Sharp, to Station Headquarters, Biggin Hill, 3.5.34, for duty at Weston Zoyland Practice Camp. J. S. L. Adams to No. 1 (Indian Wing) Station, Kohat, India, 4.5.34. G. W. Birkinshaw to Headquarters, Palestine and Transjordan, Jerusalem, 15.4.34. W. R. Day to Station Headquarters, Kenley, 3.5.34. R. J. A. Ford to Station Headquarters, Heliopolis, Egypt, 20.4.34. B. D. Nicholas to Station Headquarters, Upavon, 8.5.34.

Flying Officers: A. C. Weldon, to No. 4 (A.C.) Squadron, South Farnborough, 3.5.34. A. P. C. Hannay, M.C., to No. 4 (A.C.) Squadron, South Farnborough, 4.5.34. W. C. Pitts to Air Armament School, Eastchurch, 10.5.34. B. J. McGinn to No. 4 (A.C.) Squadron, South Farnborough, 6.5.34. W. R. Wills-Sandford to School of Army Co-operation, Old Sarum, 9.5.34.

Pilot Officers: The following Pilot Officers are posted on appointment to permanent commissions: A. W. B. Barrett, to No. 9 (B.) Squadron, Boscombe Down, 30.4.34. A. F. Johnson, to No. 111 (F.) Squadron, Hornchurch, 30.4.34.

30.4.34. C. G. R. Lewis, to No. 54 (F.) Squadron, Hornchurch, 30.4.34. V. E. Maxwell, to School of Army Co-operation, Old Sarum, 30.4.34.

Acting Pilot Officers: S. G. Birch to No. 45 (B.) Squadron, Helwan, Egypt, 19.4.34. F. D. Nugent to No. 8 (B.) Squadron, Aden, 20.4.34.

Stores Branch

Squadron Leaders: T. G. Bowler to Headquarters, R.A.F., Middle East, Cairo, 22.4.34, for Equipment (Stores) Staff duties, vice Sqdr. Ldr. A. Garrity. H. S. F. T. Jerrard to Headquarters, Air Defence of Great Britain, Uxbridge, 12.5.34, for Equipment Staff (Stores) duties.

Flight Lieutenant: D. W. Dean, to Station Headquarters, Kenley, 1.5.34.

Flying Officers: F. G. Lee to Headquarters, R.A.F., Middle East, Cairo, 16.4.34. P. G. Pool to No. 2 Stores (Ammunition) Depot, Altrincham, 9.5.34.

Accountant Branch

Flying Officers: V. Matveieff, to Station Headquarters, Kenley, 7.5.34. F. Rigby, to Station Headquarters, Hornchurch, 15.5.34.

Medical Branch

Flight Lieutenants: A. H. Barzilay, to Station Headquarters, Kenley, 3.5.34. A. A. Townsend, to R.A.F. Base, Calshot, 10.5.34.

Chaplains Branch

Rev. G. A. Davies, to Station Headquarters, Boscombe Down, 9.5.34, for duty as Chaplain (C. of E.) at Boscombe Down and Netheravon, vice Rev. R. N. Shapley, M.C. Rev. R. N. Shapley, M.C., to R.A.F. Base, Calshot, 9.5.34 for duty as Chaplain (C. of E.), vice Rev. A. G. Kayll.

THE ROYAL AIR FORCE BENEVOLENT FUND

The usual meeting of the Grants Committee of the Fund was held at Idlesleigh House on May 15. Mr. W. S. Field was in the Chair, and the other Members of the Committee present were:—Air Commodore B. C. H. Drew, C.M.G., C.B.E., Mrs. F. Vesey Holt, Wing-Commander H. P. Lale, D.S.O., A.F.C. The Committee considered in all a number of cases, and made grants to the amount of £446 5s. 6d.

STUDY OF MODERN FOREIGN LANGUAGES

The undermentioned officers and airmen passed the examinations held (except where otherwise stated) in January, 1934, at the centres stated against their names:—

ARABIC Colloquial

Wing Com. R. T. Leather, A.F.C.	..	..	Middle East.
Flt. Lt. A. C. Cuming	..	..	Middle East.
Flt. Lt. A. E. Evans-Evans	..	..	Iraq.
F/O K. M. Cass	..	..	Middle East.
F/O N. C. Hyde	..	..	Middle East.
F/O T. J. McInerney	..	..	Iraq.
F/O J. W. C. Revill	..	..	Iraq.
F/O D. Sloan	..	..	Iraq.
P/O N. W. Wakelin	..	..	Iraq.
Warrant Officer 2nd Class H. Beattie	..	..	Middle East.
Warrant Officer 2nd Class H. W. Jervis	..	..	Middle East.
Warrant Officer 2nd Class J. H. Styles	..	..	Middle East.
Warrant Officer 2nd Class E. G. Newman	..	..	Iraq.
L.A.C. E. C. Dack	..	..	Middle East.
L.A.C. F. Crocker	..	..	Middle East.
L.A.C. W. A. Wozencroft	..	..	Middle East.
L.A.C. E. J. H. Winterton	..	..	Middle East.

Interpretership (2nd Class)

F/O A. E. Fairs Middle East.

FRENCH Preliminary

Sqd. Ldr. D. V. Carnegie, A.F.C.	..	..	London.
Rev. R. D. Grange Bennett	..	..	Iraq.
Flt. Lt. L. Darvall, M.C.	..	..	Iraq.
F/O D. Stephenson	..	..	London.
F/O G. E. Valentine	..	..	London.
Sgt. F. Holt	..	..	Iraq.
L.A.C. A. W. Gregg	..	..	Malta.
L.A.C. W. H. J. Daw	..	..	Middle East.

Interpretership (2nd Class)

Sqd. Ldr. P. R. T. J. M. I. C. Chamberlayne,	..	..	Iraq.
A.F.C.	..	..	London.
Flt. Lt. C. S. Cadell	..	..	London.
Flt. Lt. A. J. L. Hughes	..	..	London.

GERMAN Preliminary

Flt. Lt. C. A. Hoy, M.C.	..	..	London.
Flt. Lt. E. C. de V. Lart	..	..	London.
F/O J. J. Zwarenstein	..	..	London.
561048 L.A.C. G. L. Collins	..	..	Malta.

ITALIAN Preliminary

L.A.C. G. L. Collins	..	..	Malta.
L.A.C. P. J. Pope	..	..	Malta.

KURDISH Colloquial

Flt. Lt. J. C. A. Johnson Iraq.

Interpretership (1st Class)

Flt. Lt. C. B. R. Pelly, M.C. Iraq, October, 1933.

MALAY Colloquial

L.A.C. W. R. Taylor	..	..	Far East.
L.A.C. R. McGill	..	..	Far East.
L.A.C. M. G. Steele	..	..	Far East.

SPANISH Preliminary

F/O A. R. Morton London.

Interpretership (2nd Class)

L.A.C. W. L. Whittaker Malta.

The following awards payable may be issued to the officers stated. The awards in respect of the examinations in Arabic (colloquial) and Malay are withheld pending the results of the June, 1934, examinations:—

Flt. Lt. C. S. Cadell	..	..	£12
Flt. Lt. C. B. R. Pelly, M.C.	..	..	£60
F/O A. E. Fairs	..	..	£30

The undermentioned officer passed the second-year examination in Japanese held in Tokyo in December, 1933, and has received the appropriate award (£75):—

Flt. Lt. W. M. C. Kennedy.

The undermentioned officer passed the first-year examination in Chinese held in Peking in February, 1934, and has received the appropriate award (£75):—

Flt. Lt. G. Bartholomew.

SERVICE NOTES

Singapore-Hong Kong Cruise

THREE Supermarine "Southampton" (Napier "Lions") of No. 205 (F.B.) Squadron, Singapore, under the command of Group Capt. S. W. Smith, O.B.E. (O.C., Far East Command), reached Singapore on May 13th after making a 4,000-mile circuit of the China Sea.

Residence of A.O.C. Armament Group

It is proposed that Admiralty House, Sheerness, should become the residence of Air Commodore L. A. Pattinson, D.S.O., M.C., D.F.C., the newly-appointed Air Officer Commanding, Armament Group, Eastchurch.

Ware Kenley

PILOTS are warned that Royal Air Force aircraft will be carrying out intensive formation flying practice from Kenley aerodrome daily until the end of June, 1934, except when the controlled zone scheme detailed in Notice to Airmen No. 33 of the year 1934, is in force. Civil aircraft should avoid flying within two miles of this aerodrome, except in emergency, during the above-mentioned period.

Nomenclature of Aircraft—Overstrand

THE official name of the Boulton & Paul twin-engined day bomber aeroplane fitted with "Pegasus" engines, enclosed mechanically-operated front turret, automatic controls and revised wireless and bomb installations is "Overstrand." A development of the "Sidestrand" (two "Jupiter" VIII F.'s) which, since 1928, has been the equipment of No. 101 (B.) Squadron, the "Overstrand" is fitted with two Bristol "Pegasus" moderately-supercharged engines, an enclosed mechanically operated gun turret, automatic pilot and improved wireless and bomb gear installations. When one recalls that the "Sidestrand III," fitted with "Jupiter" X.F. engines cowled by Townend rings, had a speed of 167 m.p.h. at 11,000 ft., it is apparent that the "Overstrand," with engines of a more modern type than the "Jupiter," will have a top speed comparable with those attained by some of the latest American cantilever monoplane bombers with retractable undercarriages. And, into the bargain, it will be much more manoeuvrable, will have a higher ceiling and rate of climb and will land much more slowly than these.

New Fighter Types

A NUMBER of designs for single-seater fighters to a new Air Ministry specification have been prepared. Little may be said at present of either the specification or the aircraft, but there is a possibility that some of the new types will be seen in the New and Experimental Types Park at the R.A.F. Display this year. Two designs—a Supermarine and a Westland—have materialised. Both these types are fitted with Rolls-Royce experimental engines, possibly using evaporative cooling systems, and something really "super" in the way of performance may be expected.

A new type of day and night fighter, the Gloster "Gauntlet," has, of course, but recently been adopted by the Air Ministry. This machine has lately been modified and is now fitted with a Bristol "Mercury" VI S.2 engine (575/605 h.p. at 12,500 ft.), which uses the new type combined exhaust collector and Townend Ring. Other refinements include Dowty legs for the undercarriage and a tail wheel in place of the skid.

COURAGEOUS! With her Destroyer in attendance, H.M. Aircraft Carrier *Courageous* alters her course to avoid attack from the aeroplane from which this photograph was taken.

Tangmere Station Sports

THE Station Sports at Tangmere will be held on June 7th.

H.M.S. "Hornet" Joins the R.A.F.

H.M.S. *Hornet*, the submarine base, which for many years was used as an overflow submarine base for H.M.S. *Dolphin*, recently ceased to be one of His Majesty's ships, and became a unit of the Royal Air Force. The latter hope to effect a big saving by refitting their power boats at H.M.S. *Hornet* instead of placing the work with contractors.

"Demons" for Australia

EIGHTEEN "Demon" military two-seaters have been ordered by the Australian Government from the Hawker Aircraft Co., Ltd. These machines are generally similar to the "Demon" two-seater fighters which are at present in service with the R.A.F., but are specially modified to suit Australian conditions. Fitted with supercharged Rolls-Royce "Kestrel" engines, the top speed is about 180 m.p.h.

This Year's Display

FROM several points of view, the R.A.F. Display, which is to be held this year on June 30 at Hendon, promises to be better than ever before. The demonstration of new and experimental types should be particularly interesting, for the past year's crop of new military types has been particularly good. Day and Night Fighters and Torpedo-Spotter-Reconnaissance machines—the latter being an entirely new class, should be well represented. Of a more popular nature, a game of aerial skittles will be played out over Hendon. Most of the "old favourites," including air drill, low flying attack and formation aerobatics, remain in the programme. The refuelling of an aircraft in the air and the destruction of an ammunition stores are promised.



The Industry

CAPT. KEEP'S NEW POST

THE Westland Aircraft Works announce that Capt. A. S. Keep, M.C., B.Sc., who has been a director of the company for the past four years, has been appointed General Manager. Congratulations, Keep!

"GIPSY MAJOR" ENGINED D.H.86

A SECOND model of the D.H.86, the Express Air Liner at present fitted with four 200 h.p. "Gipsy Six" engines, will shortly be available with four "Gipsy Major" engines of 130 h.p. each. The top speed in this form will be 150 m.p.h., but the pay load will remain about the same as in the higher powered type.

"LEOPARD MOTH" FOR WRIGHTSON AIR HIRE

THE hire and drive yourself scheme which Wrightson Air Hire, Ltd., have been running at Heston for some time has proved so successful that they have recently augmented the fleet of aeroplanes they keep for this purpose by the addition of a new "Leopard Moth" ("Gipsy Major"). This machine will be available for qualified pilots at £4 per day, the hirer paying the cost of petrol, oil and insurance himself.

ACCUMULATORS FOR AIRCRAFT

DAGENITE accumulators of various types suitable for use in aircraft are described in a catalogue which we have received from the manufacturers, Peto & Radford, 50, Grosvenor Gardens, London, S.W.1. These accumulators have been specially designed to give very high discharge currents, such as are taken by electrical engine starters, and are suitable for use with navigation lights, wireless, etc.

THE "GERM TRIANGLE"

EVERY issue of the *Germ Triangle*, a publication circulated by Germ Lubricants, Ltd., contains a technical article on some subject connected with lubrication. The second, and latest, issue which we have received contains the report of a lecture given by Mr. J. E. Southcombe, M.Sc., on "Recent Researches in Lubrication." A copy of the *Germ Triangle* will be sent to any reader who applies, on business notepaper, to 741, Salisbury House, London, E.C.2.



L. A. Rumbold, Ltd., of Kilburn, N.W.6, do the majority of the upholstery work in our civil aeroplanes. They also manufacture a wide range of chairs made from light alloy tubing, and this illustration is of one of their latest types.

A FAIREY AIRSCREW TESTIMONIAL

IN the course of a letter to Mr. C. R. Fairey, Sir Malcolm Campbell pays tribute to the Fairey metal airscrew which was fitted to the machine in which he carried out his aerial survey. After making a landing on a promising surface in the Nahib Desert the machine turned over and embedded its nose in the soft sand. "We were," continued Sir Malcolm, "then 140 miles away from the nearest civilisation, and had no possible means of making contact with our friends."

"Digging out the machine, which in itself was a difficult matter, we found the propellor was $5\frac{1}{2}$ inches out of truth, but, notwithstanding that, the pilot succeeded in flying back to our base. . . ."

"We had the propellor straightened out in a press, and it continued to do useful work, which speaks wonders for the construction and for the material which you employ in the making of these airscrews. . . ."

SIMMONDS AEROCESSORIES, LTD.

SIMMONDS-CORSEY controls, manufactured by Simmonds Aerocessories, Ltd., are now fitted by some fifty aircraft manufacturers in well over 100 different types of machines. They are used by the Air Forces of Great Britain, Belgium, Czechoslovakia, Finland, France, Norway, Russia and the U.S.A. In commercial aviation they are used by almost all British air lines and such foreign services as Air-France, K.L.M. and American Airways. In some of the larger countries the controls are manufactured in their entirety, but in smaller countries assembly agents have been appointed who make up the units to suit local requirements from components made at the Birmingham works of Simmonds Aerocessories, Ltd.

Among recent interesting uses to which the control system has been applied are depth gear indicators for torpedo aircraft, retractable radiators, adjustable pitch airscrews and retractable undercarriages. Quite a number of well-known aircraft manufacturers utilise the system in their flying controls. K.L.M. has tried out the Simmonds-Corsey system in service and has decided to remove the old-type engine controls on the annual overhaul of its aircraft and to fit Simmonds-Corsey units.

In the Klemm "Eagle" Simmonds-Corsey controls are utilised as engine controls, flying controls and for retractable undercarriage. The raising gear for the undercarriage has been designed mutually by the Klemm Aeroplane Co. and Simmonds Aerocessories, Ltd.

PUBLICATIONS RECEIVED

Wind Tunnel Interference on Wings, Bodies and Airscrews. 1933. By H. Glauert. Price 4s. 6d. net. London: H.M. Stationery Office, W.C.2.

NEW COMPANY REGISTERED

AVIATION SOCIETY.—The Aviation Society, Ltd., was registered on May 17, as a company limited by guarantee, without share capital, with 500 members, each liable for £1 in the event of winding up. To establish, carry on and subsidise a society, association or club for the encouragement and development of aviation in all its branches; to protect the interests of persons, firms or bodies engaged in, concerned or interested in aviation throughout the British Empire. The subscribers are:—Herbert S. Murray-Tosh, 8, Campden Hill Gate, W.8, company director. Lt.-Com. Hon. Robert A. W. J. Southwell, R.N. (retired), 44, Gloucester Gardens, W.2. Arthur P. Bolland, The Heights, Woodburn Common, Bucks. John S. Pritchard, 58, Hilltop, N.W.11, company director. Brig.-Genl. Wallace Wright, 180, New Bond Street, W.1. Richard Powell, 34, Harcourt Terrace, S.W.1, company director. J. A. Mollison, Grosvenor House, W.1, aviator. Solicitors: Joynson-Hicks & Co., Lennox House, Norfolk Street, W.C.2. The file number is 288,212.

INCREASE OF CAPITAL

ARROW AIRCRAFT (LEEDS), LTD., 4, Little Russell Street, Whitehall Road, Leeds.—The nominal capital has been increased by the addition of £1,000 in £1 ordinary shares beyond the registered capital of £10,000.

PATENT AERONAUTICAL SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1933

Published May 24, 1934

- 261. INDIA RUBBER, GUTTA PERCHA & TELEGRAPH WORKS CO., LTD., and F. J. TARRIS. Control systems for brakes for the wheels of aircraft. (409,456.)
- 5,681. BENDIX AVIATION CORPORATION. Power-transmission mechanism. (409,484.)

ANSWERS TO CORRESPONDENTS.

"Flight" Queries Dept. is at the service of readers. Questions should be numbered and written on one side of the paper only, typewritten for preference, and accompanied by a stamped addressed envelope for the reply.